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DRIVEABILITY PERFORMANCE OF 1982 PASSENGER VEHICLES(U)
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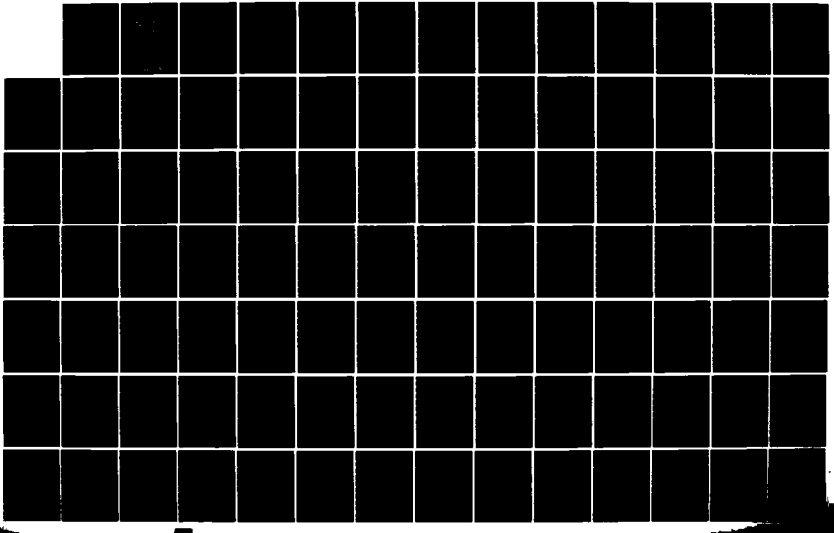

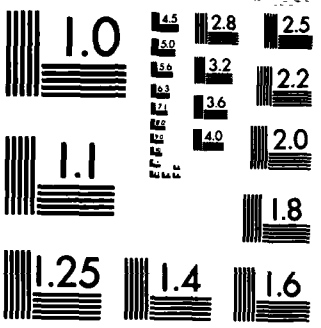

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TWO-TEMPERATURE VAPOR LOCK AND HIGH-TEMPERATURE DRIVEABILITY PERFORMANCE OF 1982 PASSENGER VEHICLES

December 1984

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219 PERIMETER CENTER PARKWAY, ATLANTA, GEORGIA 30346

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TWO-TEMPERATURE VAPOR LOCK AND HIGH-TEMPERATURE DRIVEABILITY PERFORMANCE OF 1982 PASSENGER VEHICLES

(CRC PROJECT No. CM-118-82)

Prepared by the

1982 Analysis Panel

of the

CRC Volatility Group

December 1984

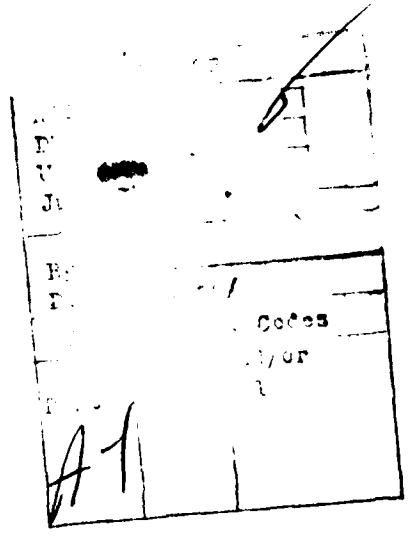
Light-Duty Vehicle Fuel, Lubricant, and Equipment Research Committee

of the

Coordinating Research Council, Inc.

ABSTRACT

The 1982 CRC High-Temperature Driveability Program was conducted at the US Army Proving Grounds near Yuma, Arizona, from September 20 through October 19, 1982, at nominal ambient temperatures of 70°F (21.1°C) and 95°F (35°C). CRC has conducted previous programs for the evaluation of vapor lock and hot start and driveability of 1971 and 1975 model passenger cars. Since 1975, vehicle designs have changed rapidly to meet more stringent exhaust emissions and fuel economy standards. These changes may affect vehicle high-temperature performance. The 1982 CRC High-Temperature Driveability Program investigated the effect of such changes on vapor lock performance of nineteen 1982 passenger vehicles at nominal temperatures of 70°F (21°C) and 95°F (35°C). The two-temperature vapor lock evaluation was used in updating ambient temperature corrections of volatility over a range of temperature from 70°F (21°C) to 95°F (35°C). Hot-start and driveability performance was evaluated at a nominal 95°F (35°C) temperature by two test procedures. A new city driveability procedure emphasized conditions that could cause performance problems encountered in heavy stop-and-go traffic after a period of temperature stabilization. Selected vehicles were also evaluated using the CRC Hot-Start and Driveability Procedure.



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I. INTRODUCTION

The 1982 CRC High-Temperature Driveability Program was conducted at the US Army Proving Grounds near Yuma, Arizona, from September 20 through October 19, 1982. The series of road tests comprising the program were conducted at nominal ambient temperatures of 70°F (21°C) and 95°F (35°C).

CRC has conducted previous programs for the evaluation of vapor lock and hot start and driveaway of 1971 and 1975 model passenger cars. Since 1975, vehicle designs have changed rapidly to meet more stringent exhaust emissions and fuel economy standards. These changes may affect vehicle high-temperature performance. The 1982 CRC High-Temperature Driveability Program investigated the effect of such changes on vapor lock performance of nineteen 1982 passenger vehicles at nominal temperatures of 70°F (21°C) and 95°F (35°C). The vapor lock tolerance of each vehicle was determined for each temperature by evaluating incremental blends from a fuel series ranging in volatility from approximately 7.0 to 17.0 psi Reid vapor pressure. Various blends were tested to determine the fuel which would give a 25 percent increase in acceleration time relative to a base acceleration. This fuel in terms of $T_{V/L=20}$ defined the vapor lock tolerance of the vehicle. The two-temperature vapor lock evaluation was used in updating ambient temperature corrections of volatility over a range of temperature from 70°F (21°C) to 95°F (35°C). In addition, an alternate vapor lock procedure was run in two vehicles.

Hot-start and driveaway performance was evaluated at a nominal 95°F (35°C) temperature by two test procedures. A new test procedure that emphasized low speed, mild acceleration, and frequent idle periods was evaluated in this program. This City Driveability Procedure emphasized conditions that could cause performance problems encountered in heavy stop-and-go traffic after a period of temperature stabilization. A special pentane-rich fuel and one or more vapor lock fuels were tested in all vehicles using the City Driveability Procedure. Eleven of the vehicles were also evaluated using the CRC Hot-Start and Driveaway Procedure. Performance was expressed for both procedures in terms of CRC demerits, with poorer performance resulting in higher demerit levels.

Appendix A lists participants in the test program, members of the Program Panel, and members of the Data Analysis and Report-Writing Panel. The program proposal approved by the CRC Volatility Group is shown in Appendix B.

II. SUMMARY

- Vapor lock severity increased in most cases as fuel volatility and ambient temperature increased.
- The 1982 model cars tested had fewer vapor lock problems than 1975 and 1971 model cars tested in previous CRC programs. A fuel with $T_{V/L=20}$ of 124°F (ASTM Class C) satisfied 75 percent of 1982 model cars, 45 percent of 1975 model cars, and 20 percent of 1971 model cars at 95°F.
- For vapor lock tests, the ambient temperature correction factor for adjusting $T_{V/L=20}$ data was established to be 0.7°F $T_{V/L=20}$ per degree ambient temperature.
- There appeared to be no appreciable difference in vapor lock performance for cars with and without fuel return lines.
- The limiting vapor lock requirements were outside the range of test fuels for five of nineteen cars at a nominal 95°F (35°C) test temperature, and for seven of nineteen cars at a nominal 70°F (21°C) test temperature.
- Ten of twelve cars at their critical soak condition had more severe vapor lock requirements at 95°F (35°C) than at 70°F (21°C).
- Twelve of fourteen cars were idle soak limited at 95°F (35°C). At 70°F (21°C), six of twelve cars were idle soak limited, and six were key-off soak limited.
- Data did not establish a definitive relationship between a vehicle's vapor lock tolerance and its hot-start and driveaway performance.
- For the City Driveability Procedure, seven vehicles showed large changes in demerit levels with changes in fuel volatility.
- Both the City Driveability Procedure and the CRC Hot-Start and Driveaway Procedure showed volatility and vehicle effects.
- From these data, there is no clear advantage to recommend either the City Driveability Procedure or the CRC Hot-Start and Driveaway Procedure for driveability evaluations.

III. TEST VEHICLES

Eighteen passenger cars and one passenger van were tested in this program. Selection was based upon a list of twenty primary and five secondary vehicles listed in the test plan, contingent upon availability from rental agencies. In the selection of test cars, consideration was given to sales volume and vehicles of special interest. All vehicles were equipped with automatic transmissions, air conditioning, and Federal exhaust emission control devices. Vehicles are described in detail in Table I.

Prior to the start of the test program, the vehicles were delivered to a contractor for test preparation. Car preparation included installation of fuel tank drains, installation of a vacuum tee, checking and adjusting timing and idle speed, and checking integrity of emission control equipment. Thermocouples were installed on test vehicles by test participants at the start of the test program. One thermocouple was taped to the exterior of the fuel line as close to the carburetor or fuel injector as possible. For General Motors vehicles, a second thermocouple was installed in the fuel tank through the drain line. For all other vehicles, a second thermocouple was taped to the exterior of the fuel line as close to the fuel pump inlet as possible. At the conclusion of the test, the vehicles were returned to the contractor for removal of the tank drains. A flat 3/32-inch brass plate was soldered over the tank drain hole.

IV. TEST FUELS

Vapor lock test fuels consisted of three base fuels of 7.1, 11.8, and 16.3 psi Reid vapor pressure (RVP) identified as RMFV 90-82, 91-82, and 92-82, respectively. The fuel series design accommodated a 10.5 psi RVP fuel as representative of a typical summer fuel, and a 13.5 psi RVP fuel as representative of a typical winter fuel. Increased volatility was accomplished primarily by the addition of butane. Intermediate test fuels were blended on-site using two blending pumps. One blending pump dispensed the low and intermediate volatility fuels and blends of the low and intermediate fuels. The other pump dispensed the intermediate and high volatility fuels and blends of the intermediate and high fuels. Table II presents the average fuel inspection data for the odd number fuels available from the blend pumps. The blends were prepared by one laboratory and were shipped to participating laboratories for analysis. Individual inspection data by participating laboratories are presented in Appendix C.

Figure 1 shows the relationship of $T_{V/L=20}$ and percent evaporated at 158°F to RVP for the series of vapor lock fuels. The curves in Figure 1 correspond to least-squares equations; the fuel series curves were used to derive the other volatility values from measured RVP's when processing data from the vapor lock and driveability tests:

$$T_{V/L=20} = 213.05 - 9.9293\ (RVP) + 0.19306\ (RVP^2)$$

$$\%@158°F = 5.94 + 1.8945\ (RVP) - 0.0099081\ (RVP^2)$$

A special fuel blend (RMFV 93-82), shown in Table II as Fuel 20 and used in simulated low-speed city driving tests, was intended to emphasize problems in the hot-start and driveaway application. It was a pentane-rich high volatility fuel. In order to relate other properties to measured RVP's on tank samples subjected to weathering during the road tests, samples of this fuel were allowed to evaporate to varying degrees, then RVP and T versus V/L curves were determined on-site at Yuma on the fresh and weathered samples. Subsequently, a retain sample was also weathered in several stages, and RVP and ASTM D 86 distillations were determined on the fresh and weathered portions at one of the cooperating laboratories. Data points and least-square curves for $T_{V/L=20}$ and percent evaporated at 158°F versus RVP of weathered RMFV 93-82 fuel are shown in Figure 1, along with corresponding curves for the vapor lock fuels. Equations for the volatility relations of weathered Fuel 20 are:

$$T_{V/L=20} = 215.71 - 9.919\ (RVP) + 0.1758\ (RVP^2)$$

$$\%@158°F = -10.524 + 3.9496\ (RVP)$$

(For percent evaporated at 158°F, the linear equation fit the data as well as a second-order equation and was, therefore, used. Since the data were obtained in only one cooperating laboratory, the constant term in the equation was adjusted to match the point for the all-laboratory average RVP and percent evaporated at 158°F.)

V. TEST FACILITIES

Facilities made available for the test work at the US Army Yuma Proving Ground included a five-mile test track, fuel storage, a soak shelter, a cold room for fuel dispensing, and a petroleum testing laboratory. A fork-lift truck, a refrigerated trailer, a temporary soak shelter to accommodate three vehicles, and a mobile office trailer were provided by CRC.

The test course, shown in Figure 2, consisted of the following:

- Yuma Proving Ground Dynamometer Course - level blacktop with two-mile straightaway and half-mile loops at each end

- Gravel roads, one to two miles long, running between the dynamometer course and Arizona Highway Route 95

- A 7.5-mile section of essentially level blacktop highway - Arizona Highway Route 95

Car warm-up was achieved by proceeding from the dynamometer course via a gravel road to the highway, driving fifteen miles on the highway, returning to the dynamometer course to complete one lap around the course (five miles), and then proceeding to the soak shelter. All vapor lock and hot-start and driveaway evaluations were conducted on the dynamometer course.

Three roofless soak shelters, twelve feet by twenty-four feet and constructed of plywood with plastic end curtains, were used primarily for vapor lock testing. A permanent twenty-foot by forty-foot roofless soak shelter with doors at both ends was used primarily for hot-start and driveaway tests.

Dry-bulb air temperature was recorded at the soak area of the dynamometer test track at fifteen-minute intervals while testing was in progress.

On-site fuel analyses were performed in the Yuma Proving Ground Petroleum Laboratory. Reid vapor pressure was determined using an automatic RVP instrument supplied by Southwest Research Institute.

A refrigerated trailer van was used for the bulk storage of all test fuels, except the low volatility vapor lock fuel, which was stored outdoors. Daily fuel supplies were stored in a large walk-in refrigerator, and were dispensed to the test cars through two blend pumps. Fuel 20 was distributed through a separate portable pump. Both the refrigerator and refrigerated trailer were maintained at approximately 40°F.

Duplicate samples were taken from the fuel tanks, through the drain line, in one-quart bottles using a Quick-Chill Sampling Apparatus. Samples were taken through the drain line to prevent significant loss of tank pressure during sampling. For all tests, samples were taken during the soak and idle periods.

VI. TEST TECHNIQUES

The 1982 CRC High-Temperature Driveability Program used four test techniques, two for vapor lock and two for hot start and driveaway:

- 1975 CRC Vapor Lock Technique
- An alternate vapor lock technique which alters the timing of the accelerations
- CRC Hot-Start and Driveaway Technique
- City Driveability Procedure

A. 1975 CRC Vapor Lock Technique

The primary vapor lock technique used in this program was the same as used in the 1975 CRC High-Temperature Driveability Program. Vapor lock was evaluated at both 70°F (21°C) and 95°F (35°C). This technique and the data rating system used are described in detail in Appendix D. In brief, the percent gain in acceleration time may be established on any one fuel by comparing a wide-open-throttle acceleration, following a prescribed idle or soak period, with the average for base accelerations obtained during the warm-up operation. The limiting volatility for a 25 percent increase in acceleration time may then be defined by bracketing with fuels which produced higher or lower acceleration times.

B. Alternate Vapor Lock Procedure

A few runs were made with an alternate vapor lock technique that altered the timing of the accelerations. The procedure used was the same as the 1975 CRC Vapor Lock Technique, with the exception that the timed acceleration was from 0 to 30, 50, and 60 mph, instead of from 15 to 50, 60, and 70 mph.

C. CRC Hot-Start and Driveaway Technique

The CRC Hot-Start and Driveaway Procedure is described in detail in Appendix D. Briefly, it consists of the following:

a. A prescribed warm-up during which a base start and run time are obtained.

b. A ten-minute idle, followed by a back-up and abrupt stop at prescribed acceleration and deceleration rates.

c. A series of accelerations of prescribed duration and rates, followed by prescribed decelerations and short idle periods.

d. A twenty-minute engine-off soak, followed by a hot start and run of sixty seconds before driveaway.

e. A repeat of Item c.

D. City Driveability Procedure

The City Driveability Procedure is a new hot-start and driveaway technique designed to appraise low-speed driveability and hot-starting problems. This new procedure was the primary driveability procedure used in the 1982 CRC High-Temperature Driveability Program, and was compared with the CRC Hot-Start and Driveaway Procedure for selected cars. The Procedure is described in detail in Appendix D. Briefly, it consists of the following:

a. A prescribed warm-up.

b. Simulated low-speed city traffic for four miles.

c. A ten-minute idle soak, followed by an acceleration.

d. Simulated low-speed city traffic for four miles.

e. A twenty-minute key-off soak, followed by a hot start, followed by an acceleration.

For both driveability procedures, hesitation, stumble, surge, backfire, and stalls are recorded during acceleration and deceleration. Idle quality and stalls are recorded during idle periods, and cranking start time and total start time are recorded after engine-off soak. In addition to the number of times a malfunction occurs, the quality of all malfunctions, except stalls and start time, are evaluated as trace, moderate, or heavy. Sample data sheets are presented in Appendix D.

VII. TEST DESIGN

Since evaluation of vapor lock tolerance of the vehicle was necessary prior to hot driveability evaluations, only vapor lock testing for 95°F (35°C) was conducted for the first two days of the program, using four test crews. On the third day, the test crews were reassigned into five test crews: three vapor lock crews and two hot driveability crews. It was necessary to extend the test program a few days longer than had been originally planned in order to obtain the desired number of hot driveability test evaluations. By the end of the program, 115 95°F (35°C) vapor lock tests, 94 70°F (21°C) vapor lock tests, 66 City Driveability Procedure tests, and 20 CRC Hot-Start and Driveaway tests had been conducted. It was discovered during the test program that the low to intermediate blending pump had malfunctioned on October 4-6, dispensing 100 percent intermediate fuel for all settings. Although tests conducted during this time resulted in valid data, the desired volatility effects were not obtained for some runs.

VIII. AMBIENT CONDITIONS

Ambient conditions were not altogether favorable during the test program. During the first week, attempts were made to evaluate vapor lock at 70°F (21°C), but ambient temperatures were such that the maximum temperature was exceeded before completion of a test. During the second test week, temperatures did not exceed 90°F (32°C); therefore, no hot driveability or 95°F (35°C) vapor lock tests were conducted. During the third test week, high winds and cool temperatures precluded extensive testing. Although more normal conditions prevailed during the fourth week, temperatures were somewhat cooler than desired. To facilitate obtaining additional test hours, it was decided during the fourth week to reduce the starting temperature for hot driveability tests to 85°F (29°C) from 90°F (32°C).

IX. ON-SITE DATA RECORDING AND PROCESSING

Preliminary data processing was conducted on-site with the aid of a microcomputer and printer. Data recorded by the test crews were transcribed from the original data sheets (sample in Appendix D) to computerized spread sheets with similar data arrangement.

For vapor lock tests, average RVP's for duplicate samples were entered on each spread sheet. The computer program automatically calculated percent increases in acceleration time and fuel $T_{V/L=20}$, both unadjusted and adjusted to 70°F or 95°F (21°C or 35°C). Correlation used on-site to estimate $T_{V/L=20}$ from RVP were based on the supplier's fuel data. When volatility data were subsequently obtained on the vapor lock fuels from cooperative laboratories, the spread sheets were recalculated with new constants from the final correlation formula. Final printouts from the vapor lock tests are shown in Appendix G.

For driveability tests, the computer program calculated driveability demerits. Results from each driveability test occupy one entire page; therefore, only summary results are included in Appendix F. A complete set of driveability printouts is available for inspection at the CRC offices.

X. DISCUSSION OF RESULTS

A. Vapor Lock

1. Limiting $T_{V/L=20}$

Vapor lock limiting $T_{V/L=20}$ is shown in Table III for each car corrected to ambient temperatures of 95°F (35°C) and 70°F (21°C). This is the $T_{V/L=20}$ for a 25 percent increase in acceleration time at the most critical soak and speed condition. At 95°F (35°C), six of the nineteen cars tested were not fully characterized as to limiting volatility with the fuel series. Cars 2, 3, 8, 13, and 18 did not encounter vapor lock on the most volatile fuel tested. Car 1 encountered vapor lock with the least volatile fuel tested. Of the cars characterized for critical soak condition at 95°F (35°C), twelve were idle soak-limited, and two were engine-off soak-limited.

At 70°F (21°C), seven of the nineteen cars tested did not encounter vapor lock on the most volatile fuel tested, and were not, therefore, fully characterized as to limiting volatility. Of the cars characterized for critical soak condition at 70°F (21°C), six were idle soak-limited, and six were engine-off soak-limited. Of the twelve cars characterized for critical soak conditions at both temperatures, five cars which were idle limited at 95°F (35°C) were engine-off limited at 70°F (21°C), one car which was engine-off limited at 95°F (35°C) was idle limited at 70°F (21°C), and six cars had the same limiting condition at both temperatures.

Of the twelve cars for which limiting $T_{V/L=20}$ was obtained at 70°F (21°C), ten had higher $T_{V/L=20}$ for limiting vapor lock at 95°F (35°C). Two cars, 9 and 11, had higher $T_{V/L=20}$ for limiting vapor lock at 70°F (21°C). For these two cars, no explanation of the reversal of expected results was obtained.

2. Ambient Temperature Vapor Lock Corrections

Vapor lock tests were conducted over a range of 87°F (30°C) to 111°F (44°C) for 95°F (35°C) vapor lock, and a range of 65°F (18°C) to 85°F (29°C) for 70°F (21°C) vapor lock. The $T_{V/L=20}$ test data were corrected from actual ambient test conditions to nominal 95°F (35°C) and 70°F (21°C) temperatures using a previously established CRC expression, where:

$$\text{Adjusted } T_{V/L=20} = \text{Actual } T_{V/L=20} + K \begin{pmatrix} 95 \\ \text{or} \\ 70 \end{pmatrix} - \text{Air Temperature}$$

The K value used was K=1.

The 70°F (21°C) vapor lock tests were performed at both idle and engine-off soak conditions, so that comparable soak condition data would be available for both test temperatures. Comparable soak condition limiting $T_{V/L=20}$'s are shown in Table IV for the ten cars that were characterized at both test temperatures. The ten cars show an average limiting $T_{V/L=20}$ difference of 17.1 between the two test temperatures, giving a 0.68 $T_{V/L=20}$ correction for a one-degree change in ambient temperature. For convenience, the correction was rounded off to 0.7. The 0.7 factor is significantly different from the 1.0 previously used adjustment factor. It also shows a significant difference from a zero correction factor. With the exception of Table IV, all adjusted vapor lock data presented in this report use a K factor of 0.7 for ambient temperature correction.

3. Vapor Lock Distributions

Figure 3 shows distribution lines for limiting $T_{V/L=20}$ for 95°F (35°C) for 1971 and 1975[1] cars tested in previous CRC programs compared with 1982 cars tested in this program. These data show a trend of decreasing vapor lock severity with more recent model year cars. A fuel with a 124°F (51°C) $T_{V/L=20}$ would satisfy 20 percent of the 1971 cars tested, 45 percent of the 1975 cars tested, and 75 percent of the 1982 cars tested under the conditions of the CRC Vapor Lock Test at 95°F (35°C).

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(1) Coordinating Research Council, Inc., "Driveability Performance of 1975 Passenger Cars at High Ambient Temperatures," CRC Report No. 490, November 1976.

The distribution of limiting $T_{V/L=20}$ values for the 1982 cars tested at 95°F (35°C) and 70°F (21°C) is shown in Figure 4 for their most severe soak and speed conditions. Six cars at 95°F (35°C) and seven cars at 70°F (21°C) had indeterminate values, because their requirements were outside the volatility range of the test fuels. The level of volatility distribution is different with the cars having a higher vapor lock severity at 95°F (35°C). The slopes of the distribution lines are different with a trend towards converging at the more severe vapor lock level.

The distribution of limiting $T_{V/L=20}$ values at 95°F (35°C) for 1982 cars with and without fuel return lines are shown in Figure 5. The slopes of the distribution lines are different, with the cars having fuel return lines showing a lower slope. There is no appreciable difference in vapor lock performance for cars with and without fuel return lines.

4. Alternate Vapor Lock Procedure

An alternate vapor lock procedure was run on two cars at 95°F (35°C). The alternate vapor lock procedure was the same as the CRC procedure, except accelerations were timed from 0 to 30, 50, and 60 mph. Limiting $T_{V/L=20's}$ for the alternate procedure and the CRC procedure are shown in Table V. Car 5 showed similar limiting $T_{V/L=20's}$ for both procedures. Car 14 was more severe on the CRC procedure. Based upon the limited data available, no conclusion can be reached as to the performance of this alternate procedure.

B. Comparison of City Driveability Procedure Versus CRC Hot-Start and Driveaway Procedure

In previous CRC tests, the CRC Hot-Start and Driveaway Procedure has shown it is capable of defining car performance in terms of fuel volatility. In this program, a limited number of tests were run using the CRC Hot-Start and Driveaway Procedure and a greater number were run using a new City Driveability Procedure. The purpose of these tests was to compare results of the two procedures and their ability to define car performance by segregating fuel effects. Detailed descriptions of both procedures are provided in Appendix D. The City Driveability Procedure includes thirty-four 0-20 mph accelerations, followed by idle periods and two 0-30 mph part-throttle accelerations. The CRC Hot-Start and Driveaway Procedure includes a back-up maneuver with moderate to severe braking, idle periods, and sixteen accelerations to different speeds at varied rates. Both procedures were completed by trained raters. Comparisons of trained rater results are provided in Appendix E.

In both cycles, driveability problems are quantified by assigning them numerical values that increase as problem severity increases. These values are termed "demerits;" large total demerit values are indicative of poor driveability. Seventeen comparison tests were completed in which the cars were run through both procedures with the same fuel and driver. The demerit values obtained are shown in Table VI. Average demerits of the City Driveability Procedure were about twice the average of the CRC Hot-Start and Driveaway Technique. The total weighted demerit (TWD) values for comparable runs are plotted in Figure 6. The linear relationship between the two cycles was:

$$TWD(CITY) = 1.48\ TWD(CRC) + 92.6$$

$$R^2 = 0.23$$

Three cars were significantly more severe on the CRC procedure than the new procedure (cars 7, 9, and 14). Although no single driving problem caused the differences in demerits between the two procedures, demerits from driving stalls were about 34 to 51 percent higher for the CRC technique with the most volatile fuel. Correlation between the procedures was improved significantly when these cars were deleted from the model:

$$TWD(CITY) = 3.15\ TWD(CRC) - 98.9$$

$$R^2 = 0.69$$

To segregate fuel effects, regression models typically are developed which relate fuel volatility characteristics (i.e., $T_{V/L=20}$, RVP, %@158°F, or distillation temperatures) to car performance. Unfortunately, this fuel set was not designed to segregate volatility effects on driveability, nor were the tests performed in a balanced scheme which lends to proper model development. Consequently, models that identify the significant volatility parameter could not be developed for either test. Some regression work was completed with data from the City Driveability Procedure, but it is in a very general form (see Appendix F). Although the data indicate that both tests can separate fuels of different volatility, the ability of the new City Driveability Procedure versus the CRC Hot-Start and Driveaway Procedure to identify significant fuel parameters that affect car performance cannot be determined from this program. To evaluate the two test techniques, another program specifically designed to assess hot-weather driveability is required.

C. Comparison of Vapor Lock Versus City Driveability

To determine if there was a relationship between vapor lock performance and the City Driveability Procedure performance, a ranking was made of vapor lock and driveability performance. The ranking of the City Driveability Procedure performance was made with data obtained from the runs using the pentane-rich fuel (Fuel 20), since all nineteen cars were run on this fuel. The vehicles were ranked in order of decreasing vapor lock volatility tolerance and of increasing hot-start and driveaway total weighted demerits. These rankings are shown in Table VII and plotted in Figure 7. Those cars with undetermined limiting $T_{V/L=20}$ were ranked equally, and were not included in the data regression analysis. The regression line shown in Figure 7 has a positive slope of 0.34 and a coefficient of determination of 0.20. These data do not establish a strong relationship between a vehicle's vapor lock volatility tolerance and its city cycle hot-start and driveaway performance.

D. Fuel System Temperature Measurements

Fuel system temperatures were obtained on seventeen of the test vehicles for 95°F (35°C) vapor lock tests and for fourteen of the vehicles for 70°F (21°C) vapor lock tests. The following temperature measurements were obtained:

- Surface temperature of the fuel line at the inlet to the carburetor or fuel injector for all vehicles.
- Temperature of the fuel in the fuel tank for all General Motors vehicles.
- Surface temperature of the fuel line at the inlet to the fuel pump for all non General Motors vehicles.

The average temperature of the fuel line at the inlet to the carburetor or fuel injector for all runs for each soak for each vehicle are listed in Tables VIII and IX for the 95°F (35°C) and 70°F (21°C) vapor lock tests, respectively. Tables X and XI show similar data for the fuel pump and fuel tank temperatures. Temperature data between idle and key-off soaks in some cases are not comparable. This is due to the nature of the vapor lock test, since after a few runs, idle or key-off is established as the limiting condition and further runs are not made on the non-limiting condition. In these cases, the number in parentheses is the average temperature for the runs in which both soak conditions were run.

There was no apparent correlation between vapor lock performance and fuel system temperatures. It would be expected that the critical soak condition that produced the highest carburetor and/or fuel pump temperature would be the most critical vapor lock condition. Table XII shows that for twelve cases, the most critical vapor lock soak condition also showed the highest carburetor and fuel pump temperatures. It also shows that for thirteen cases, the highest carburetor and/or fuel pump temperatures did not occur for the most critical vapor lock condition.

TABLES

AND

FIGURES

TABLE I

DESCRIPTION OF TEST CARS

(1982 Model Year)

Make	Model	Engine Disp., ℓ	PS	PB	Fuel Return	Vehicle Identification No.	Fuel Inj.	Elec. F.P.	Emission System*
Buick	Century	3.0	Y	Y	N	1G4AL19E4C0402668	N	N	CL
Buick	Limited	3.8	Y	Y	N	1G4AM47A1CR110954	N	N	CL
Cadillac	Sedan DeVille	4.1	Y	Y	Y	1G6AV6982C9229870	Y	Y	CL
Chevrolet	Cavalier	1.8	Y	Y	N	1G1AD69G7CC125391	N	N	CL
Chevrolet	Chevette	1.6	Y	N	N	1G1AB68C9CA113775	N	N	CL
Chevrolet	Citation	2.5	Y	Y	Y	1G1AX68R8C6105093	Y	Y	CL
Chevrolet	Monte Carlo	3.8	Y	Y	N	1G1AZ37K5OR157602	N	N	CL
Datsun	210	1.5	N	Y	Y	JN1PB025XCU692212	N	N	OL
Ford	Club Wagon	4.9	Y	Y	N	1FMEE11E4CHA53342	N	N	OL
Ford	Escort	1.6	Y	Y	Y	1FABP0628CW122769	N	N	OL
Ford	Granada	3.3	Y	Y	Y	1FABP27BOCA126399	N	N	OL
Ford	Granada	3.8	Y	Y	Y	1FABP27BOCG127235	N	N	OL
Ford	Mustang	2.3	Y	Y	Y	1FABP10AOCF147848	N	N	OL
Lincoln	Town Car	5.0	Y	Y	Y	1LNBP94FXCY621223	N	N	CL
Honda	Accord	1.8	Y	Y	N	JHMSZ3427CC023143	N	Y	OL
Oldsmobile	Cutlass	4.3	Y	Y	N	1G3AM6980CM480736	N	N	CL
Plymouth	Reliant	2.2	Y	Y	Y	1P3BP46B9CF223384	N	N	CL
Toyota	Corolla	1.8	Y	Y	N	JT2TEL2L4C0738623	N	N	OL
Volkswagen	Rabbit	1.7	Y	Y	Y	1VWBB0174V010629	Y	Y	CL

* CL = Closed Loop
  OL = Open Loop

TABLE II

AVERAGE TEST FUEL PROPERTIES

Fuel No.	1	3	5	7	9	11	13	15	17	20
RMFV	90-82	-	-	-	91-82	-	-	-	92-82	93-82
RVP, psi	7.1	8.2	9.3	10.6	11.8	13.1	14.2	15.4	16.3	13.4
$T_{V/L=20}$, °F(°C)	152.5(66.9)	145.0(62.8)	137.2(58.4)	129.0(53.9)	123.0(50.5)	116.5(46.9)	110.3(43.5)	106.3(41.3)	102.2(39.0)	107.2(41.8)
Distillation (D-86) T°F (T°C) @ % Evap.										
10	136 (57.8)	132 (55.5)	123 (50.5)	120 (48.9)	114 (45.5)	106 (41.1)	100 (37.8)	94 (34.4)	93 (33.9)	98 (36.7)
50	228 (108.9)	229 (109.4)	225 (107.2)	224 (106.7)	222 (105.5)	220 (104.4)	216 (102.2)	213 (100.5)	212 (100.0)	184 (84.4)
90	347 (175.0)	348 (175.5)	345 (173.9)	346 (174.4)	344 (173.3)	343 (172.8)	344 (173.3)	346 (174.4)	343 (172.8)	300 (148.9)
EP	417 (213.9)	418 (214.4)	416 (213.3)	417 (213.9)	416 (213.3)	416 (213.3)	414 (212.2)	414 (212.2)	414 (212.2)	415 (212.8)
API Gravity	56.8	57.6	58.5	59.4	60.4	61.4	62.1	63.0	63.8	74.4

TABLE III

LIMITING VAPOR LOCK AT 95°F(35°C) AND 70°F(21°C)

Car No.	95°F (35°C) Critical Test Condition $LT_{V/L=20}$			70°F (21°C) Critical Test Condition $LT_{V/L=20}$		
	Hot Soak	Speed	°F (°C)	Hot Soak	Speed	°F (°C)
1	I	70	>150(>65.5)	KO	70	123 (50.5)
2	--	--	<108(<42.2)	--	--	<100(<37.8)
3	--	--	<103(<39.4)	--	--	< 97(<36.1)
4	KO	50,60,70	113 (45.0)	I	70	99 (37.2)
5	I	50	126 (52.2)	I	60	102 (38.9)
6	I	60,70	107 (41.7)	KO	50	105 (40.5)
7	I	50,60,70	113 (45.0)	KO	50,60,70	104 (40.0)
8	--	--	<113(<45.0)	--	--	< 99(<37.2)
9	I	60	119 (48.3)	KO	50	126 (52.2)
10	I	50,60,70	124 (51.1)	KO	50	118 (47.8)
11	KO	60,70	122 (50.0)	KO	70	130 (54.4)
12	I	60,70	125 (51.7)	I	70	103 (39.4)
13	--	--	<108(<42.2)	--	--	<106(<41.1)
14	I	60,70	124 (51.1)	I	70	103 (39.4)
15	I	70	121 (49.4)	--	--	<104(<40.0)
16	I	70	127 (52.8)	I	60,70	104 (40.0)
17	I	60,70	111 (43.9)	--	--	< 99(<37.2)
18	--	--	<111(<43.9)	--	--	<105(<40.5)
19	I	50	127 (52.8)	I	50	100 (37.8)

Note: I = Idle; KO = Key Off

TABLE IV

COMPARISON OF LIMITING $T_{V/L=20}$ AT 95°F (35°C) AND 70°F (21°C)

Car	Soak Condition	Limiting $T_{V/L=20}$, °F (°C) 95 (35)	70 (21)	Δ Limiting $T_{V/L=20}$ (95-70)
4	KO	114 (45.5)	99 (37.2)	15 (8.3)
5	I	126 (52.2)	98 (36.7)	28 (15.5)
7	I	110 (43.3)	100 (37.8)	10 (5.5)
9	I	118 (47.8)	116 (46.7)	2 (1.1)
10	I	123 (50.5)	107 (41.7)	16 (8.8)
11	KO	125 (51.7)	126 (52.2)	-1 (-0.5)
12	I	124 (51.1)	101 (38.3)	23 (12.8)
14	I	119 (48.3)	101 (38.3)	18 (10.0)
16	I	124 (51.1)	102 (38.9)	22 (12.2)
19	I	134 (56.7)	96 (35.5)	38 (21.2)
	AVERAGE			17.1 (9.49)

CHANGE IN $T_{VL=20}$/CHANGE IN AMBIENT TEMPERATURE 0.68°F (0.38°C)

Note: I = Idle; KO = Key Off

TABLE V

ALTERNATE VAPOR LOCK PROCEDURE VERSUS

CRC VAPOR LOCK PROCEDURE

	CRC		ALTERNATE	
Car No.	Limiting Condition	$LT_{V/L=20}$, °F(°C)	Limiting Condition	$LT_{V/L=20}$, °F(°C)
5	Idle 15-50	125 (52.2)	Idle 0-30	127 (52.8)
14	Idle 15-60	124 (51.1)	Idle 0-60	116 (46.7)

TABLE VI

COMPARABLE DRIVEABILITY RUNS

		CRC			CITY		
			Temperature			Temperature	
Car	Fuel	TWD	°F	°C	TWD	°F	°C
1	1	263	89.3	31.8	757	82.0	27.8
2	20	130	88.8	31.5	99	92.6	33.7
2	17	124	92.3	33.5	126	87.6	30.9
3	20	47	93.0	33.9	164	99.4	37.4
3	17	97	91.0	32.8	86	104.2	40.1
5	20	324	92.3	33.5	850	89.8	32.1
5	5	156	93.8	34.3	230	90.4	32.4
7	20	187	93.8	34.3	22	105.4	40.8
7	14	219	89.0	31.7	8	93.0	33.9
9	20	326	90.0	32.2	376	98.2	36.8
9	9	248	92.8	33.8	269	93.0	33.9
10	20	239	89.5	31.9	820	88.6	31.4
12	20	259	87.0	30.6	793	99.8	37.7
12	5	115	88.0	31.1	660	103.2	39.6
14	20	374	93.3	34.1	480	84.6	29.2
14	6	55	90.8	32.7	360	106.2	41.2
16	20	186	92.3	33.5	445	92.0	33.3
AVERAGE		197	91.0	32.8	385	94.7	34.8
No. Maneuvers for TWD		36			72		
Avg. TWD/Maneuver		5.5			5.3		

TABLE VII

TEST VEHICLE VAPOR LOCK AND CITY DRIVEABILITY RANKINGS

Rank	City Driveability TWD	Car No.	Critical $T_{V/L=20}$ @ 95°F (35°C)	Car No.
1	0	8	<103 (<39.4)	3
2	9	6	<108 (<42.2)	2
3	22	7	<108 (<42.2)	13
4	24	13	<111 (<43.9)	18
5	60	11	<113 (<45.0)	8
6	61	18	107 (41.7)	6
7	70	19	111 (43.9)	17
8	99	2	113 (45.0)	4
9	138	17	113 (45.0)	7
10	164	3	119 (48.3)	9
11	214	15	121 (49.4)	15
12	376	9	122 (50.0)	11
13	445	16	124 (51.1)	10
14	480	14	124 (51.1)	14
15	772	10	125 (51.7)	12
16	775	1	126 (52.2)	5
17	812	12	127 (52.8)	16
18	850	5	127 (52.8)	19
19	891	4	>150 (>65.5)	1

TABLE VIII

CARBURETOR FUEL LINE TEMPERATURES FOR 95°F(35°C) VAPOR LOCK TESTS

Car No.	Critical Vapor Lock Condition(1)	Temperatures, °F Key-Off Soak Ambient	Carb.	Δ (2)	Temperatures, °F Idle Soak Ambient	Carb.	Δ (2)
1	I	105	150	45	104	180(183)(3)	76
3	NL	102	173	71	107	172(176)	65
4	KO	88	147(147)	59	87	144	57
5	I	92	194	102	90	194(188)	104
6	I	102	188	86	104	180(179)	76
7	I	105	170(170)	65	105	170	65
9	I	106	156	50	100	167(170)	67
10	I	97	147	50	97	156(152)	59
11	KO	89	193	104	--	--	--
12	I	111	174	63	102	176(184)	74
13	NL	110	160	50	102	153(161)	51
14	I	110	216	106	101	183(194)	82
15	I	97	168	71	95	173(173)	78
16	I	101	152	51	94	156(160)	62
17	I	90	130	40	90	134	44
18	NL	89	151	62	90	124	34
19	I	107	172	65	91	160(168)	69

(1) I = Idle, NL = Not Limited, KO = Key-Off.

(2) Δ = Carburetor Temperature - Ambient Temperature.

(3) Number in parentheses is the average temperature for only those runs in which both key-off and idle soaks were conducted.

TABLE IX

CARBURETOR FUEL LINE TEMPERATURES FOR 70°F(21°C) VAPOR LOCK TESTS

Car No.	Critical Vapor Lock Condition(1)	Temperatures, °F Key-Off Soak Ambient	Carb.	Δ (2)	Temperatures, °F Idle Soak Ambient	Carb.	Δ (2)
1	KO	75	129	54	76	159	83
3	NL	78	145	67	80	142	62
4	I	76	138	62	77	135	58
5	I	75	173	98	78	171	93
6	KO	77	158	81	78	159	81
7	KO	73	142	69	74	139	65
9	KO	77	140	63	77	127	50
10	KO	76	131	55	77	136	59
11	KO	77	185	108	77	148	71
12	I	74	147	73	77	156(152)(3)	79
14	I	75	184(177)	109	74	164(156)	90
15	NL	65	136	71	66	139	73
16	I	81	136	55	74	131(148)	57
17	NL	--	--	--	79	114	35
19	I	76	148	72	77	145	68

(1) I = Idle, NL = Not Limited, KO = Key-Off.

(2) Δ = Carburetor Temperature - Ambient Temperature.

(3) Number in parentheses is the average temperature for only those runs in which both key-off and idle soaks were conducted.

TABLE X

FUEL PUMP INLET AND FUEL TANK TEMPERATURES FOR 95°F(35°C) VAPOR LOCK TESTS

Car No.	Critical Vapor Lock Condition(1)	Temperatures, °F Key-Off Soak Amb.	Pump	Tank	Δ(2)	Temperatures, °F Idle Soak Amb.	Pump	Tank	Δ(2)
1	I	105	--	110	5	104	--	113(112)(3)	9
3	NL	102	--	106	4	107	--	116(118)	9
4	KO	88	128	--	40	87	128	--	41
5	I	92	--	--	--	88	--	97	9
6	I	102	--	108	6	104	--	111(112)	7
7	I	105	--	108(108)	3	105	--	114	9
9	I	106	144	--	38	100	148(152)	--	48
10	I	97	125	--	28	97	147(144)	--	50
11	KO	92	142(153)	--	50	106	174	--	68
12	I	111	125	--	14	102	151(158)	--	49
14	I	110	172	--	62	101	151(194)	--	50
15	I	97	--	113	16	97	--	113(110)	16
16	I	101	154	--	53	94	161(164)	--	67
19	I	--	--	--	--	89	168	--	79

(1) I = Idle, NL = Not Limited, KO = Key-Off.

(2) Δ = Fuel Pump Inlet or Fuel Tank Temperature - Ambient Temperature.

(3) Number in parentheses is the average temperature for only those runs in which both key-off and idle soaks were conducted.

TABLE XI

FUEL PUMP INLET AND FUEL TANK TEMPERATURES FOR 70°F(21°C) VAPOR LOCK TESTS

Car No.	Critical Vapor Lock Condition(1)	Temperatures, °F Key-Off Soak Amb.	Pump	Tank	Δ(2)	Temperatures, °F Idle Soak Amb.	Pump	Tank	Δ(2)
1	KO	75	--	82	7	76	--	87	11
3	NL	78	--	82	4	80	--	91	11
4	I	76	119	--	43	77	118	--	41
5	I	75	--	80(83)(3)	5	78	--	88	12
6	KO	77	--	83	6	78	--	87	9
7	KO	73	--	80	7	74	--	86	12
9	KO	77	120	--	43	77	119	--	42
10	KO	76	108	--	32	77	123	--	46
11	KO	76	126	--	50	76	145	--	69
12	I	74	98	--	24	77	134(120)	--	57
14	I	75	140(133)	--	65	74	125(120)	--	51
16	I	81	137	--	56	74	136(155)	--	62
19	I	76	111	--	35	77	148	--	71

(1) I = Idle, NL = Not Limited, KO = Key-Off.

(2) Δ = Fuel Pump Inlet or Fuel Tank Temperature - Ambient Temperature.

(3) Number in parentheses is the average temperature for only those runs in which both key-off and idle soaks were conducted.

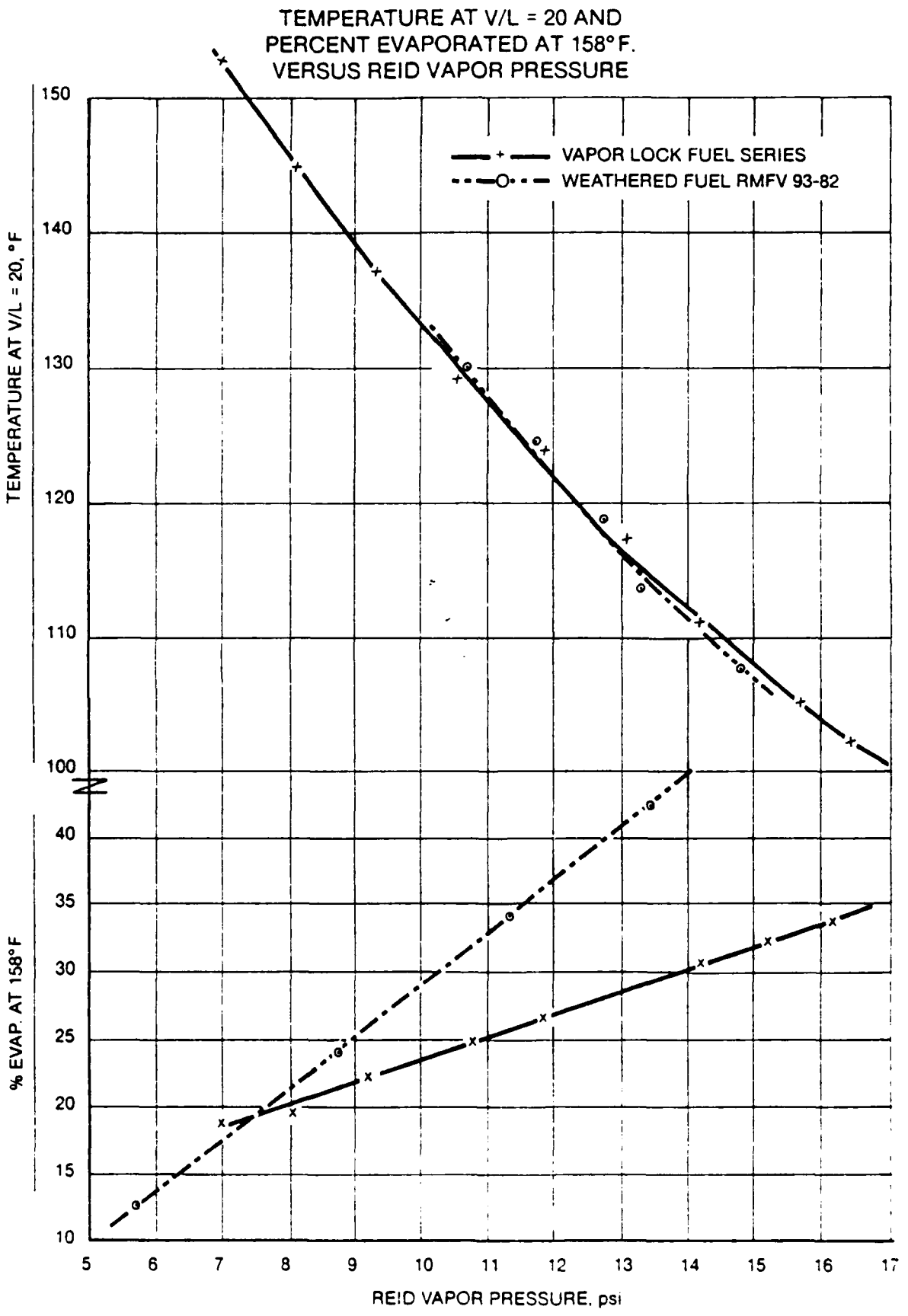
TABLE XII

CONDITION OF MAXIMUM TEMPERATURE VERSUS VAPOR LOCK CRITICAL CONDITION

Car No.	95°F (35°C) Vapor Lock			70°F (21.C) Vapor Lock		
	Critical Vapor Lock Condition	Condition for Highest Temperature Recorded		Critical Vapor Lock Condition	Condition for Highest Temperature Recorded	
		Carb.	Fuel Pump		Carb.	Fuel Pump
1	I	I	--	KO	I	--
3	NL	I	--	NL	KO	--
4	KO	KO	KO & I	I	KO	KO
5	I	KO	--	I	KO	KO
6	I	KO	--	KO	I	--
7	I	KO & I	--	KO	KO	--
9	I	I	I	KO	KO	KO
10	I	I	I	KO	I	I
11	KO	--	I	KO	KO	I
12	I	I	I	I	I	I
13	NL	I	--	--	--	--
14	I	KO	I	I	KO	KO
15	I	I	--	NL	I	--
16	I	I	I	I	I	I
17	I	I	--	NL	--	I
18	NL	KO	--	I	KO	I
19	I	KO	--	I	KO	I

NOTE: I = Idle; NL = Not Limited; KO = Key Off

Figure 1


TEMPERATURE AT V/L = 20 AND
PERCENT EVAPORATED AT 158° F.
VERSUS REID VAPOR PRESSURE
VAPOR LOCK FUEL SERIES
WEATHERED FUEL RMFV 93-82
TEMPERATURE AT V/L = 20, °F
% EVAP. AT 158°F
REID VAPOR PRESSURE, psi
150
140
130
120
110
100
40
35
30
25
20
15
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16
17

Figure 2

TEST COURSE

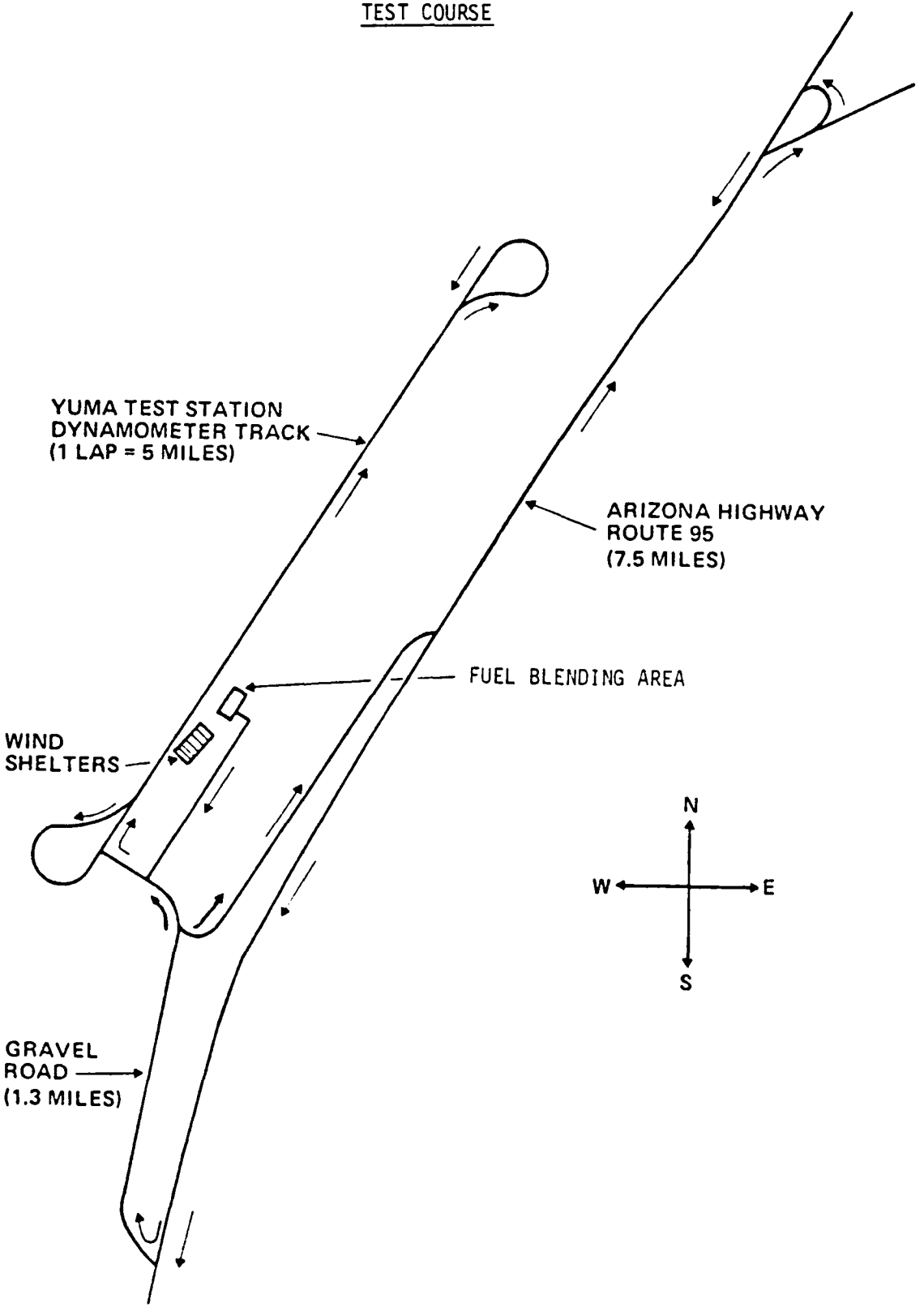


Figure 3

DISTRIBUTION OF LIMITING $T_{V1.2}$
FOR THREE MODEL YEARS AT 95°F (35°C)

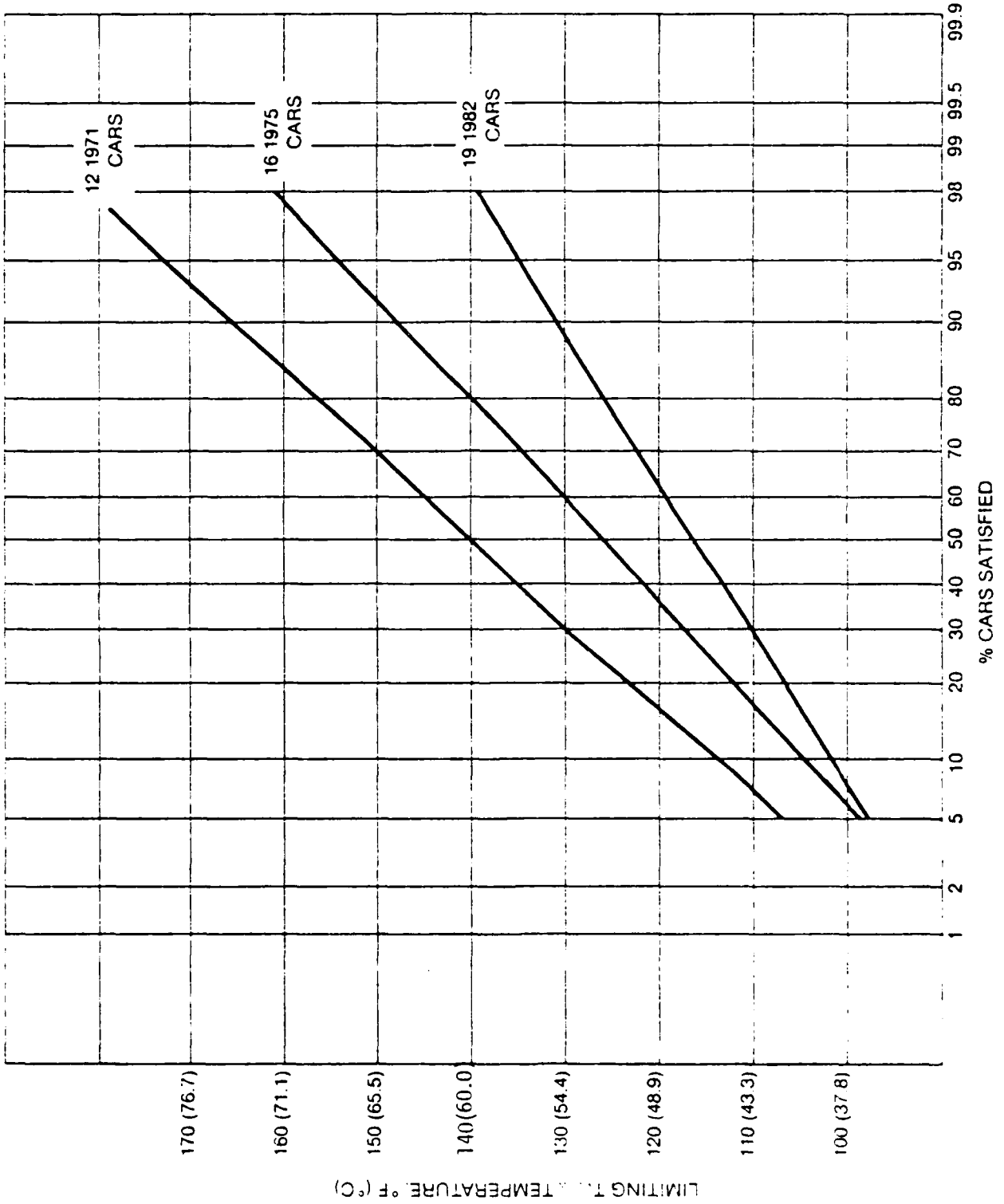


Figure 4

DISTRIBUTION OF LIMITING $T_{VL\cdot 20}$
AT 70°F (21°C) AND 95°F (35°)

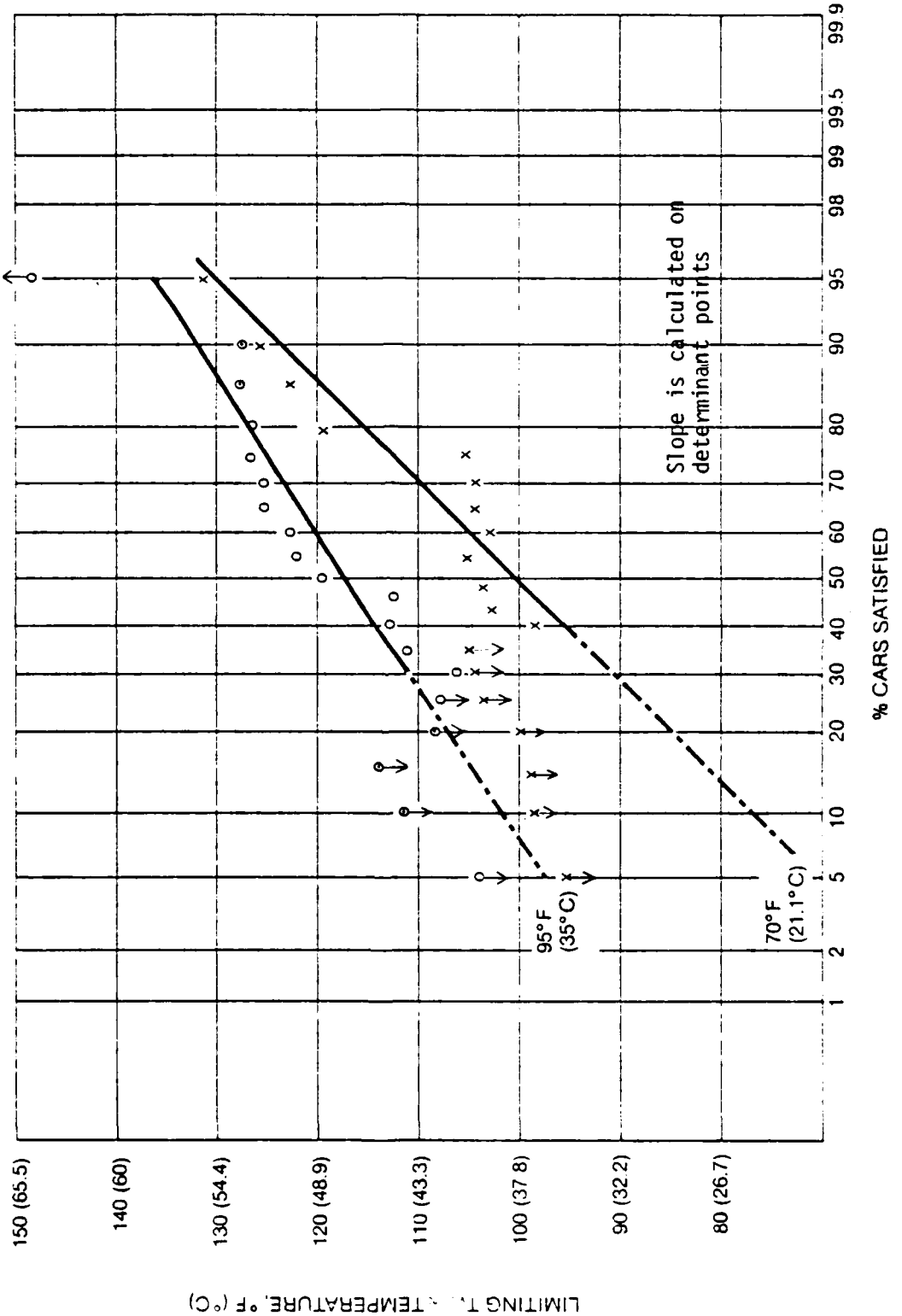


Figure 5

DISTRIBUTION OF LIMITING $T_{va,\infty}$
OF 1982 MODEL YEAR CARS
EQUIPPED WITH FUEL-RETURN VERSUS NON-FUEL-RETURN LINES

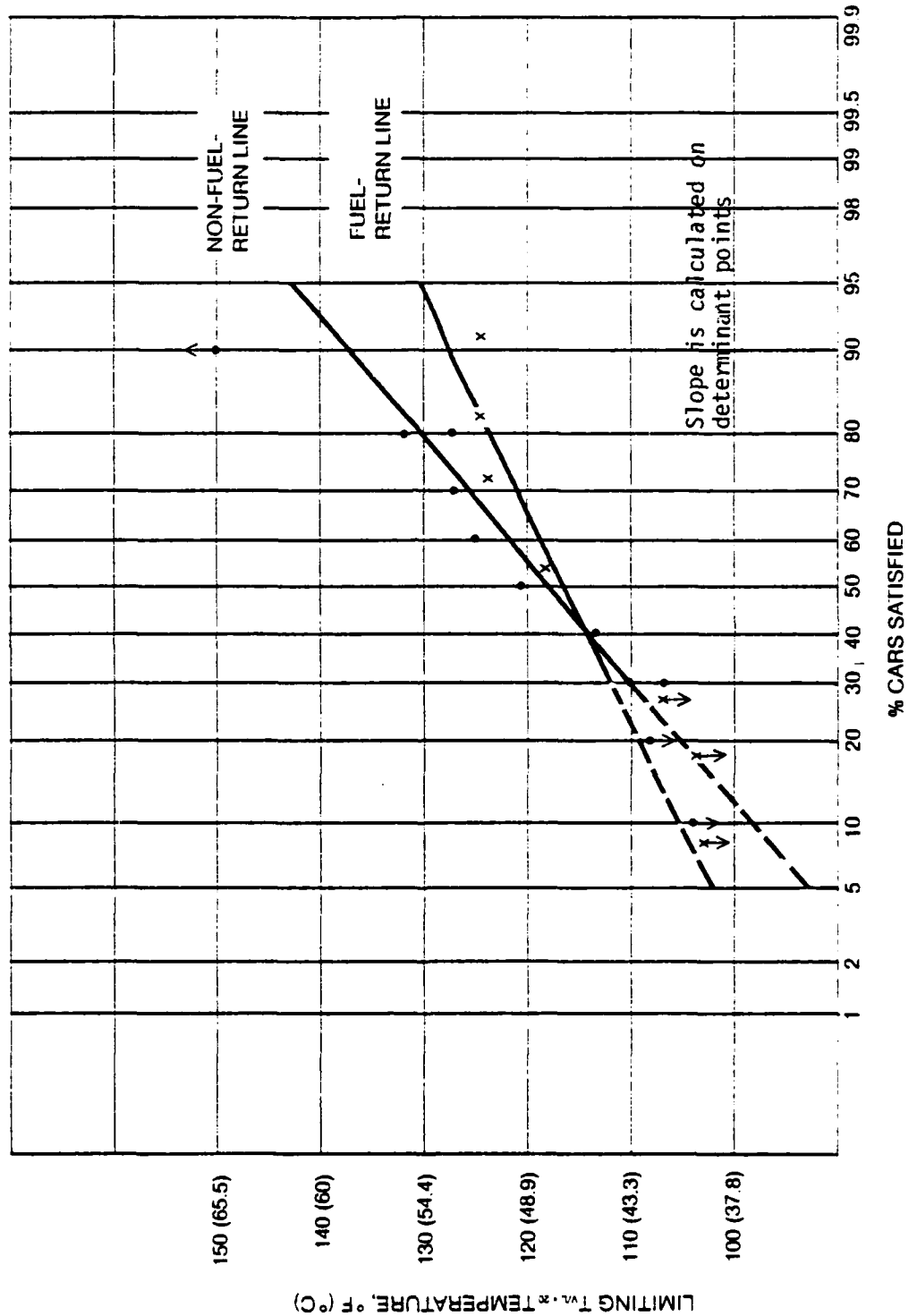


Figure 6

TWD's: COMPARABLE DRIVEABILITY RUNS

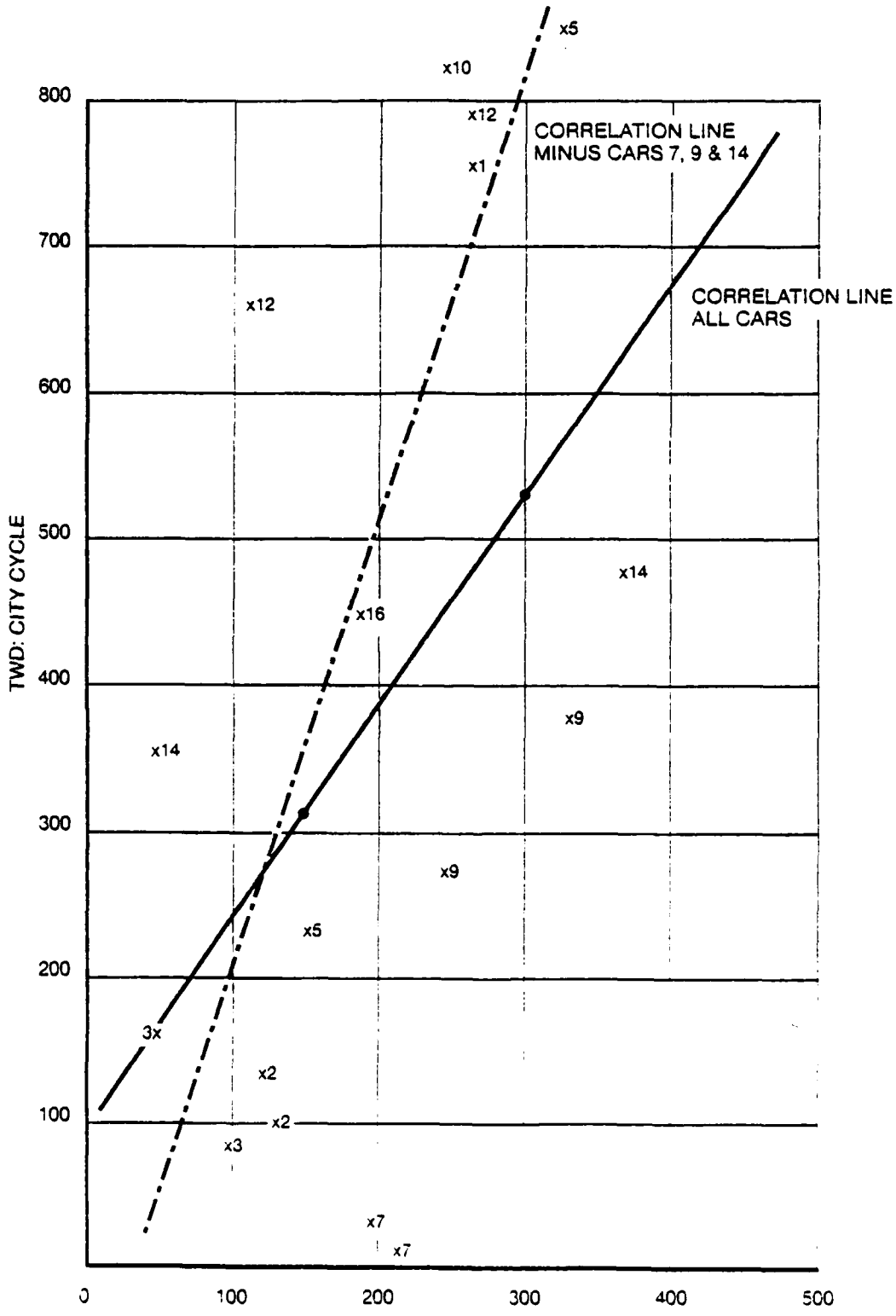
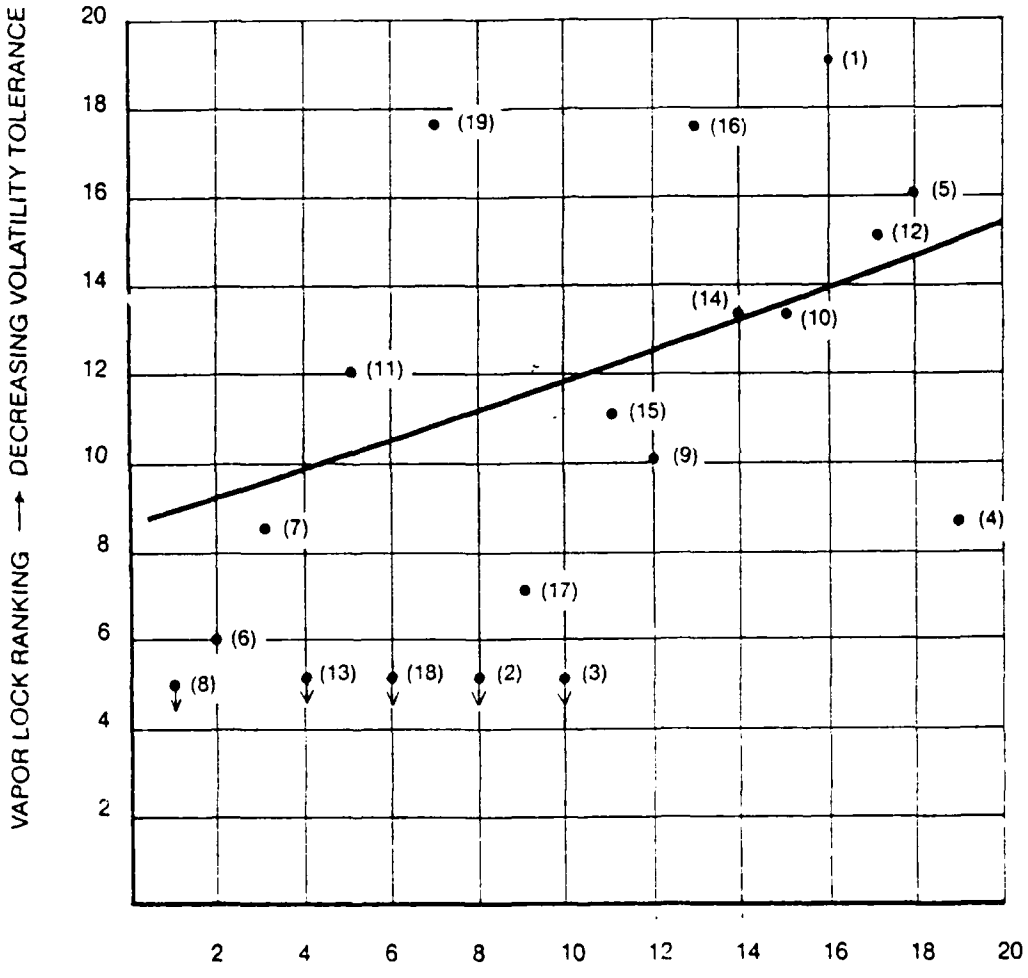


Figure 7

VEHICLE RANKING:
VAPOR LOCK VERSUS HOT START AND DRIVEAWAY
(BY CAR NUMBER)



APPENDIX A

PROGRAM PARTICIPANTS
AND
PANEL MEMBERSHIPS

PROGRAM PANEL

Name	Company
J. E. Robinson, Ldr.	Standard Oil Company (Ohio)
J. C. Ingamells	Chevron Research Company
D. K. Lawrence	Amoco Oil Company
R. E. Paggi	Texaco Inc.
R. L. Russell	Union Oil Company of California
E. H. Schanerberger	Ford Motor Company
R. T. Simmons	Chrysler Corporation
M. S. Stawnychy	Mobil Research & Development Corp.
E. D. Steinke	Sun Tech, Inc.

ANALYSIS PANEL

Name	Company
J. E. Robinson, Ldr.	Standard Oil Company (Ohio)
D. A. Barker	Shell Development Company
K. D. Eng	Texaco Inc.
J. L. Keller	Consultant
P. D. McFarland	Amoco Oil Company
R. L. Russell	Union Oil Company of California
M. S. Stawnychy	Mobil Research & Development Corp.
E. D. Steinke	Sun Tech, Inc.

PROGRAM PARTICIPANTS

Name	Company
D. A. Barker	Shell Development Company
A. E. Buczynsky	Sun Tech, Inc.
N. D. Esau	Amoco Oil Company
D. W. Hall	Chevron Research Company
G. S. Hyek	Gulf Research & Development Company
J. L. Keller	Consultant
K. M. Mathis	American Honda
R. McDonald	Carter Automobile Div., ACF Industries
D. E. McCorkell	Union Oil Company of California
E. E. Ness	Phillips Petroleum Company
T. Noguchi	American Honda
J. E. Robinson	Standard Oil Company (Ohio)
R. M. Reuter	Texaco Inc.
R. L. Russell	Union Oil Company of California
J. Shaw	Carter Automobile Div., ACF Industries
E. Smith	Southwest Research Institute
M. S. Stawnychy	Mobil Research & Development Corp.
E. D. Steinke	Sun Tech, Inc.
K. Toshimitsu	American Honda
T. Tsukamoto	American Honda

A P P E N D I X B

PROGRAM: 1982 CRC HIGH-TEMPERATURE
DRIVEABILITY PROGRAM

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

CRC Project No. CM-118-82

Prepared by the

Program Panel

of the

CRC Light-Duty Volatility Group

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1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

Objective

Determine vapor lock performance of a selected group of 1982 cars at nominal temperature of 70°F and 95°F. Determine hot start and driveaway performance of the same group of cars at a nominal temperature of 95°F.

Introduction

CRC has conducted high temperature programs for the evaluation of vapor lock and hot start and driveability on 1972 and 1975 model passenger cars. Since 1975, changes in vehicle design that may affect high temperature performance are exhaust emission systems, design for fuel economy, and introduction of new front wheel drive designs. This program will indicate the effect of such changes on vapor lock performance at a nominal temperature of 95°F. In addition, vapor lock will be evaluated at a nominal temperature of 70°F. The lower temperature vapor lock evaluation will be useful in updating ambient temperature corrections of volatility and in giving guidance for volatility specification for a range of temperatures from 70 to 95°F.

A new hot start and driveaway procedure will be investigated in this program. The new procedure emphasizes conditions that might cause performance problems encountered in heavy stop and go traffic after a period of temperature stabilization. Selected cars will compare performance results from the 1975 CRC hot start and driveaway procedure to the new procedure.

Test Fuels

Vapor lock test fuels consisting of three base fuels of 6.0, 12.0, and 17.0 RVP are identified as RMFV 90-82, 91-82, and 92-82, respectively. The fuel series is representative of a typical 10.5 lb. RVP summer fuel and a 13.5 lb. RVP winter fuel. Test fuel specifications are shown in Attachment A.

A special fuel blended to emphasize hot start and driveaway problems is also shown on the fuel specification sheet as RMFV 93-82. Use of this fuel is discussed in the test procedure section.

Test Cars

Twenty-one test vehicles are selected for the test program as follows for 1982:

Car No.	Make and Model	Engine Size, Liter/Type
1	GM T Body Chevrolet Chevette Pontiac T-1000	1.6/L-4
2	GM J Body Chevrolet Cavalier Pontiac J-2000 Buick Skyhawk Oldsmobile Firenza Cadillac Cimmaron	1.8/L-4
3	GM A Body Chevrolet Celebrity Pontiac A-6000 Buick Century Oldsmobile Ciera	2.5/L-4
4	GM X Body Chevrolet Citation Pontiac Phoenix Buick Skylark Oldsmobile Omega	2.8/V-6
5	GM G Body Chevrolet Malibu Chevrolet Monte Carlo Pontiac Bonneville Pontiac Grand Prix Buick Regal Oldsmobile Cutlass	2.8/V-6
6	GM G Body Chevrolet Malibu Chevrolet Monte Carlo Pontiac Bonneville Pontiac Grand Prix Buick Regal Oldsmobile Cutlass	3.0/V-6
7	Buick Regal	3.8/V-6
8	Buick LeSabre	4.1/V-6
9	Ford Escort-Mercury Lynx	1.6/L-4
10	Ford Mustang-Mercury Capri	2.3/L-4
11	Ford Futura-Granada	3.3/L-6

Car No.	Make and Model	Engine Size, Liter/Type
12	Ford Futura-Granada	3.8/V-6
13	Ford Futura-LTD-Thunderbird	4.2/V-8
14	Plymouth Reliant-Dodge Aries	2.2/L-4
15	Datsun 210	1.4 or 1.5/L-4
16	Toyota Corolla	1.8/L-4
17	Volkswagen Rabbit	1.6/L-4
18	Honda Accord	1.8/L-4
19	Chevrolet Van	5.0/V-8
20	Ford Van	4.9/V-8
21	Dodge Van	3.7/L-6

In some cases, several vehicles are listed, such as Chevrolet Celebrity, Pontiac A-6000, Oldsmobile Ciera, or Buick Century for a General Motors A-body car with a 2.5-liter engine. The actual car to be tested will be determined by a particular model of the choices listed being available from the rental agency. If one or more of the selected vehicles are not available, alternate selections are as follows:

1. Dodge Diplomat, or equivalent, with a 3.7-liter engine
2. Cadillac Deville with a 4.1-liter engine
3. Lincoln with a 5.0-liter engine
4. Chevrolet S-10 pickup truck
5. Ford Ranger pickup truck with a 2.3-liter engine

All vehicles are to be equipped with automatic transmission and air conditioning. Car preparation will include checking timing, idle speed, emission control system operation, installation of vacuum gauge lines, installation of temperature thermistors and installation of fuel tank drains.

Vapor Lock Test Procedure

The vapor lock test procedure will essentially be the same as used in the 1975 CRC program. A copy of this procedure is shown as Attachment B. Sections 12a, b, c, d, and e will change the speed for determining increases in acceleration times from 70 mph to 60 mph. Test temperatures will be 65 to 80°F for the lower temperature portion of the program and 90 to 105°F for the higher temperature portion. Data will be corrected to 70 and 95°F for the lower and higher temperatures of the program.

If time allows, selected cars will be evaluated by an alternate vapor lock procedure. Vapor lock evaluation will be made by timing accelerations from 0 to 30, 50, and 60 mph. All other aspects of the alternate procedure will be the same as the CRC procedure. Purpose is to compare the severity of timed accelerations from 0 to 30, 50, and 60 mph of the alternate procedure with timed accelerations of 15 to 50, 60, and 70 mph of the current CRC procedure.

Hot Start and Driveaway Test Procedure

The hot start and driveaway test procedure is designed to appraise low speed driveability and hot starting problems. The procedure is based on a similar procedure devised and conducted by Amoco Oil Company. The procedure consists of stabilization at 55 mph, simulated city traffic for 4 miles to maximize engine heating, a 10 minute idle soak, simulated city traffic for 3 miles, a 20 minute key-off soak, and simulated city traffic for 3 miles. Details of the procedure are included as Attachment C. Stabilization will be run on the highway and the simulated city course in a marked course on the Yuma Proving Grounds Dynamometer Track.

Each car will make the following runs:

- two fuels bracketing the critical vapor lock fuel ($\pm$ 1 lb. RVP)
- duplicate tesets with Fuel RMFV 93-82
- the lowest volatility fuel (6 lb. RVP) only if problems occur with Fuel RMFV 93-82.

Fuel RMFV 93-82 is a high volatility, pentane-rich fuel that is designed to emphasize problems occurring in simulated low speed city driving. Fuel samples will be obtained at the end of each soak and inspected for RVP using an automatic RVP apparatus.

If time allows, up to five selected cars that had hot start and driveaway problems on the new procedure will also be run on the 1975 CRC Hot Start and Driveability Procedure. This will allow comparison of the severity of the two procedures. The 1975 CRC Hot Start and Driveability Procedure is included as Attachment D.

Temperature Measurements

Temperature measurements will be obtained at two locations on all vehicles. A common point of temperature measurement will be the surface temperature of the vehicles fuel line at a position of 6 to 12 inches from the carburetor. The second temperature point will be selected by the various car manufacturers or by panel members if a recommendation is not made by the manufacturers. Temperatures will be obtained during the first and last minute of all soak periods for vapor lock and hot start and driveaway tests.

Test Location and Schedule

Suitable temperatures and facilities are available at the Yuma Army Proving Grounds. Suggested timing is September 20, 1982 to October 15, 1982. Twenty-three test days are available. Two days are rescheduled for test site setup and driver practice. Temperature studies indicate a daily average of 2.2 hours of 70 to 80°F temperatures, and 5.1 hours of 90 to 100°F temperatures. Additional test time is probably available because of extending the test temperatures to 65 to 80°F and 90 to 105°F. With three-man test crews a full vapor lock test requires 55 minutes. After establishing the most severe soak, idle or key off, a vapor lock test requires 35 minutes. With the assumption that three vapor lock tests (one out of three to be a full vapor lock test) can be averaged for the 2.2 hours available at the lower temperatures and six at the higher temperatures, it will require 14 test days to complete the 65 to 80°F vapor lock tests and 7 days to complete the 90 to 105°F vapor lock tests. The hot start and driveaway tests will require 12 days to complete at 90 to 100°F. This leaves an allowance of 7 days at the lower temperature and 2 days at the higher temperature for adverse weather or alternate vapor lock procedure.

Manpower

Manpower requirements are based on a four-week test program, twenty-one test vehicles, and three test crews. Requirements are as follows:

3	Drivers-Raters
3	Observers
3	Preparers and Warmup
1	Data Analysis
1	Lab Operator
1	Track Boss
1	Track Assistant and Fuel Dispenser
13	Total

ATTACHMENT A

TEST FUEL SPECIFICATIONS FOR 1982 VOLATILITY PROGRAM

	RMFV 90-82[1]	RMFV 91-82	RMFV 92-82[2]	RMFV 93-82
RVP, psi	6.0 ± 0.5	12.0 ± 0.5	17.0 ± 0.5	13.5 ± 1
Distillation, °F (D86)				
10% Evap.	145 ± 10	110 ± 10	90 ± 10	95 ± 10
30% Evap.	200 ± 10	160 ± 10	140 ± 10	135 ± 10
50% Evap.	235 ± 10	215 ± 10	205 ± 10	175 ± 10
70% Evap.	270 ± 10	265 ± 10	260 ± 10	230 ± 10
90% Evap.	350 ± 10	345 ± 10	345 ± 10	290 ± 10
End Point	437 Max.	437 Max.	437 Max.	437 Max.
Percent Evap. @ 158°F				40 - 45
V/L 20, °F				108 ± 4
Octane				
MON	85 Min.			
(R+M)/2	89 Min.			
Lead, g/gal	0.05 Max.			
Phosphorus, g/gal	0.005 Max.			
Sulfur, % wt.	0.10 Max.			
Benzene, % vol.	1.0 Max.			
Antioxidant, PTB Phenylene Diamine type	5 Min.			

(1) 10.5 psi RVP blend of RMFV 90-82 and RMFV 91-82 to have percent evap. @ 158°F between 25-30%.

(2) 13.5 psi RVP blend of RMFV 91-82 and 92-82 to have percent evap. @ 158°F between 30-35%.

ATTACHMENT B

CRC VAPOR LOCK TEST PROCEDURE

1. Drain gasoline tank and refill with 8 gallons (6 gallons with tanks of 16-gallon capacity or less) of test fuel for the next test. Test fuel shall not be put in tanks more than 10 minutes before the start of the test. Take fill sample in duplicate if scheduled.

2. Drive 20 miles at 55 mph for vehicle warm-up, establishing base total start time after 15 miles of operation.

3. Obtain baseline acceleration time on the track following 15 miles of warm up by accelerating from a stop, at light throttle, to reach 10 mph within 5 seconds. Then accelerate at the desired throttle position (wide-open throttle) to 70 mph, timing by stopwatch from 15 mph to 50, 60, and 70 mph, as indicated by speedometer. Record acceleration times and note surging or abnormal vehicle performance. Complete one lap around the track at 55 mph and return to wind shelter.

4. Park car in soak shed for 15 minutes with engine off. Obtain soak fuel sample in duplicate.

5. At end of soak period, start car using vehicle manufacturer's recommended procedure. Record start time to nearest 0.1 second and number of stalls. Idle for 5 seconds in neutral after the original start and any restarts, and record any abnormality in the stability of idle performance. Accelerate from soak shed as described in Item 6.

6. Turn headlights on. Obtain wide-open throttle acceleration time by accelerating from the soak shed at part throttle to reach 10 mph in 5 seconds, and then accelerate at wide-open throttle to 80 mph, recording time from 15 mph to 50, 60, and 70 mph. Record acceleration time and abnormal vehicle performance. In this technique, a transient and/or abnormal change in acceleration rate is called surge. The intensity of surge may vary, as described below:

   Satisfactory (S) - A rating indicating no malfunction. Some loss in acceleration may be measured, but no surging in the accepted understanding of the term may be recognized.

   Trace (T) - A rating that is just discernible to a test driver; or might not be observed by the casual driver.

   Moderate (M) - A rating that is judged to be probably noticeable to the average driver and definitely noticeable to the test driver. It is occasional in frequency and is associated with limited delays in acceleration rather than an actual decrease in speed.

Heavy (H) - A rating that is pronounced and judged to be obvious to any driver. It is persistent or constant in frequency and is associated with prolonged delays in acceleration or even actual decreases in speed level reached.

Lock (L) - That which completely stalls the engine over a stretch of at least 3/10 of a mile, or a period of time in excess of 20 seconds.

Turn headlights off at north turn.

7. Complete two laps around the track at 55 mph, to restabilize temperatures.

8. Idle for 10 minutes in neutral in the soak shed. Record number of stalls. Obtain "idle" fuel sample in duplicate.

9. At end of idle period, accelerate from soak shelter as described in Item 6.

10. Complete one lap around the track at 55 mph; return to fueling area.

11. Car volatility tolerances are to be defined only for the more critical condition (soak or idle); the remaining tests will be run as follows:

    a. If the fuel selected for the previous test was either too volatile or too low in volatility to determine whether the idle or the soak acceleration was the more critical, the soak and idle procedure shall be repeated on a new test fuel.

    b. If, during the preceding test, the soak acceleration is found to be appreciably more critical than the idle acceleration (>20% increase in acceleration time) with a fuel giving 25 to 75% loss in acceleration performance, the remaining tests will be run using only the soak procedure, otherwise the idle procedure will be used in all cases.

12. Continue testing with other fuels of different T-V/L levels to obtain curves of acceleration time from 15-50, 15-60, and 15-70 mph versus fuel volatility. To establish the vehicle limiting T-V/L data, a minimum of five fuels of each series will be tested at the desired limiting condition (soak or idle). Fuels will be selected with the following objectives:

    a. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 50 and 100%.

    b. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 25 and 50%.

c. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 10 and 25%.

d. A fuel with sufficient volatility to result in less than a 10% increase in acceleration time, or if minimum acceleration time exceeds 10%, two fuels giving essentially equal performance and differing by at least 4°F in the temperature for 20:1 V/L ratio (0.5 to 1.0 lb RVP).

e. A fuel estimated to give a 25% increase in acceleration time to 70 mph.

ATTACHMENT C

CITY DRIVEABILITY PROCEDURE

AND DRIVEABILITY RATINGS

1. Stabilize engine and fuel system temperatures by driving 15 miles at 55 mph.

2. Drive 4 miles in "city" traffic simulated as follows:

   A. Within each mile stop 4 times for a 15 second idle, and at the end of each mile idle for 30 seconds to record driveability problems. All idle soaks should be about 0.2 miles apart.

   B. Maximum car speed should be 20 mph.

   C. Accelerate very gently following each idle by dropping the engine vacuum at the start of an acceleration by 5" Hg below its idle value and hold the throttle at this position until the car reaches 20 mph.

The purpose of this portion of the test is to maximize engine heating and underhood temperatures. During this portion of the test, the driver should rate the severity of subjective problems, such as hesitation, stumble, surge, idle roughness, and backfire; and count the number of stalls.

3. Idle for 10 minutes in the soak shelter with the transmission in neutral or "Park" for safety. Appraise idle quality, record stalls and restart times if stalling occurs. Obtain fuel samples for RVP inspection.

4. Leave the soak shelter and make a 0-30 mph part-throttle (3" Hg manifold vacuum) acceleration. Observe severity of any acceleration problems including hesitation, stumble, and surge.

5. Drive 3 miles in city traffic per Step 2 above.

6. Park in a soak shelter for 20 minutes with key off. Observe hot start stalls and measure restart time. Obtain fuel samples for RVP inspection.

7. Repeat Step 4 above.

8. Compile driveability demerits for the cycle using an appropriate rating scale, which weighs problems according to their relative severity.

ATTACHMENT D

CRC HOT START AND DRIVEAWAY PROCEDURE

1. Drain fuel tank and fill with 8 gallons of test fuel.

2. Drive 20 miles at 55 mph for vehicle warm-up, establishing base total start time after running 15 miles of operation.

3. Pull into soak shed and idle in neutral for 10 minutes. Record idle speed and quality initially, after 5 minutes, and at the end of 10 minutes.

4. Back vehicle out of soak shed for approximately 30 feet and stop abruptly (10 ft./sec.^{2}). Record idle quality during 10-second idle in drive. Also number of stalls, and restart time, if any.

5. Accelerate from 0 to 30 mph at 5 ft./sec.^{2}, stop abruptly (20 ft./sec.^{2}). Evaluate and record hesitation, stumble, surge, and stall.

6. Idle in drive for 15 seconds, recording idle quality.

7. Accelerate at 5 ft./sec.^{2} from 0-45 mph. Evaluate and record hesitation, stumble, surge, and stall.

8. Make four successive accelerations from 0-25 mph at 5 ft./sec.^{2}. Decelerate moderately, using brake, and idle for 15 seconds following each acceleration. Record hesitation, stumble, surge, stall, and idle speed and quality for each cycle of operation.

9. Immediately following final 15 second idle in Item 8, accelerate at 8" Hg. constant manifold vacuum from 0-55 mph. Record hesitation, stumble, surge, and stalls.

10. Complete 10 miles at 55 mph for temperature restabilization.

11. Pull into soak shed and idle in drive for one minute. Record idle speed and quality.

12. Turn off engine and soak for 20 minutes. Obtain duplicate fuel sample.

13. At the end of the soak period, with the transmission in park or neutral, set the throttle to manufacturer's recommendation. Engage the starter immediately after opening throttle. Do not pump the throttle before making the start. If the engine does not start after 15 seconds of cranking, depress throttle to floor board; crank an additional 15 seconds to check for overrich condition. If engine does not start, manipulate throttle as required to start engine. Record initial start time and detail any abnormal starting procedure.

14. When engine starts, allow it to accelerate to 1000 rpm before de-energizing start motor and releasing throttle to idle position. The engine must continue to run for one minute after the throttle is returned to idle to constitute a successful start and run test. If engine stalls, immediately repeat starting and idle procedure. If engine stalls 4 times in succession, increase idle speed as required to keep engine running. Evaluate and record idle quality and speed, number of stalls, and total starting time. Total starting time is the cumulative period of time the starter motor is engaged. The time interval that the engine is idling between stalls is not included in total starting time.

15. Repeat Items 4 through 9 and return to fueling area.

APPENDIX C

FUEL INSPECTION DATA

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

INDIVIDUAL LABORATORY RESULTS

Fuel 1

	Lab. 1		Lab. 2		Lab. 3		Lab. 4			
	1	2	1	2	1	2	1	2	Avg.	Std. Dev.
RVP, psi	7.4	7.0	7.0	7.0	7.0	7.0	7.3	7.0	7.1	0.16
API Gravity	57.0	57.0	56.9	56.8	56.7	57.0	56.5	56.3	56.8	0.26
$T_{V/L=20'}$ °F	154	154	153.1	153.0	154.3	153.4	149.0	149.0	152.5	2.19
Distillation (D86) T °F @ % Evap.										
IBP	108	101	93	99	94	96	87	88	96	6.9
5	130	127	123	122	120	114	113	114	120	6.3
10	142	140	138	138	138	130	131	134	136	4.3
20	165	163	161	161	162	154	157	159	160	3.5
30	188	187	187	186	187	181	183	184	185	2.4
40	212	209	210	211	210	205	206	206	209	2.6
50	231	229	229	230	230	225	227	227	228	2.0
60	248	247	247	248	249	243	245	244	246	2.1
70	269	268	271	271	289	265	266	265	270	7.8
80	303	300	304	303	308	300	300	299	302	3.0
90	348	345	352	348	349	343	345	347	347	2.8
95	375	373	384	378	381	374	374	376	377	3.9
EP	417	415	410	408	412	414	430	432	417	9.0

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INDIVIDUAL LABORATORY RESULTS

Fuel 3

	Lab. 1		Lab. 2		Lab. 3		Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	1	2		
RVP, psi	7.6	8.2	8.1	8.1	8.1	8.1	8.5	8.5	8.2	0.28
API Gravity	57.8	57.8	57.6	57.7	57.7	57.5	57.4	57.6	57.6	0.14
$T_{V/L=20'}$ °F	148	146	145.1	145.1	146.0	146.8	141.4	141.5	145.0	2.37
Distillation (D86) T °F @ % Evap.										
IBP	96	100	93	93	96	97	89	92	94	3.4
5	118	122	118	114	115	119	114	114	117	3.0
10	132	136	132	130	132	134	131	129	132	2.2
20	156	159	157	155	158	159	159	157	158	1.5
30	182	185	184	182	184	185	185	183	184	1.3
40	205	208	208	208	209	208	210	208	208	1.4
50	226	229	229	230	231	229	233	228	229	2.1
60	244	247	247	248	248	248	250	247	247	1.7
70	266	269	270	269	272	272	271	268	270	2.1
80	299	302	303	301	305	304	304	301	302	2.0
90	346	347	350	347	347	346	352	348	348	2.1
95	373	375	379	378	378	375	377	375	376	2.1
EP	414	418	410	412	413	416	432	428	418	7.9

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INDIVIDUAL LABORATORY RESULTS

Fuel 5

	Lab. 1		Lab. 2		Lab. 3			Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	3	1	2		
RVP, psi	8.9	9.0	9.3	9.3	9.4	9.3	9.3	9.7	9.7	9.3	.27
API Gravity	58.5	58.5	58.6	58.6	58.3	58.7	58.7	58.4	58.4	58.5	.14
$T_{V/L=20'}$ °F	138	138	138.6	137.0	138.0	137.0	138.6	134.9	135.1	137.2	1.40
Distillation (D86) T °F @ % Evap.											
IBP	90	92	93	88	88	88	86	83	85	88	3.2
5	114	117	113	107	105	101	100	102	107	107	6.1
10	127	129	127	123	125	120	118	119	122	123	3.9
20	151	153	151	147	151	144	144	146	148	148	3.3
30	178	182	179	176	179	173	171	176	177	177	3.3
40	204	207	205	204	205	200	198	202	203	203	2.8
50	227	229	226	225	226	223	222	224	223	225	2.2
60	246	247	245	244	246	243	242	237	243	244	3.0
70	266	268	268	267	269	265	264	265	266	266	1.7
80	301	302	302	299	303	298	297	300	298	300	2.1
90	344	347	351	345	347	342	341	345	345	345	2.9
95	375	375	384	377	381	373	373	374	374	376	3.8
EP	426	418	414	408	414	410	408	424	422	416	6.8

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INDIVIDUAL LABORATORY RESULTS

Fuel 7

	Lab. 1		Lab. 2		Lab. 3		Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	1	2		
RVP, psi	10.2	10.3	10.6	10.7	10.6	10.5	11.1	10.6	10.6	0.27
API Gravity	58.8	59.7	59.5	59.6	59.4	59.2	59.5	59.5	59.4	0.28
$T_{V/L=20'}$ °F	132	130	130.0	129.3	129.3	129.3	125.3	126.7	129.0	2.08
Distillation (D86) T °F @ % Evap.										
IBP	93	90	91	86	88	84	88	88	88	2.8
5	108	109	104	102	101	101	100	111	104	4.2
10	120	121	118	116	119	118	115	133	120	5.6
20	144	146	143	140	144	144	142	150	144	2.9
30	174	175	173	170	173	171	170	171	172	1.9
40	202	203	201	199	202	198	198	198	200	2.1
50	225	226	225	223	225	221	221	224	224	1.9
60	244	245	244	243	245	242	243	240	243	1.7
70	264	265	266	264	267	265	266	268	266	1.4
80	297	297	300	297	299	298	302	305	299	2.9
90	342	343	349	343	341	342	352	353	346	4.9
95	370	372	377	371	373	375	386	392	377	7.9
EP	418	417	408	408	416	405	432	434	417	10.8

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INDIVIDUAL LABORATORY RESULTS

Fuel 9

	Lab. 1		Lab. 2		Lab. 3		Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	1	2		
RVP, psi	11.5	11.5	11.7	11.7	11.8	11.8	12.3	12.3	11.8	0.32
API Gravity	60.5	60.7	60.3	60.4	60.2	60.4	60.1	60.2	60.4	0.19
$T_{V/L=20'}$ °F	122	125	127.0	121.5	124.7	122.7	120.4	120.4	123.0	2.38
Distillation (D86) T °F @ % Evap.										
IBP	87	87	93	88	86	83	82	85	86	3.4
5	103	102	102	100	98	96	96	96	99	3.0
10	117	114	116	114	115	112	113	112	114	1.8
20	138	138	138	137	140	137	137	137	138	1.0
30	167	168	169	166	171	166	168	167	168	1.7
40	197	197	199	198	201	198	197	197	198	1.4
50	222	222	222	221	226	222	221	221	222	1.6
60	242	242	242	241	246	243	243	242	243	1.5
70	263	263	267	265	268	264	265	264	265	1.8
80	295	295	298	297	300	298	297	298	297	1.7
90	341	342	349	346	345	341	344	344	344	2.7
95	372	370	387	380	377	373	377	377	377	5.3
EP	415	414	408	406	416	414	427	432	416	8.8

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INDIVIDUAL LABORATORY RESULTS

Fuel 11

	Lab. 1		Lab. 2		Lab. 3		Lab. 4			
	1	2	1	2	1	2	1	2	Avg.	Std. Dev.
RVP, psi	12.8	12.9	12.9	12.9	13.2	13.1	13.6	13.6	13.1	0.32
API Gravity	61.6	61.8	61.2	61.3	61.1	62.2	60.6	61.0	61.4	0.50
$T_{V/L=20'}$ °F	119	121	117.5	115.4	114.9	117.3	113.4	113.6	116.5	2.67
Distillation (D86) T °F @ % Evap.										
IBP	85	86	86	79	81	79	76	78	81	3.9
5	97	99	95	84	92	88	84	86	91	6.0
10	109	109	108	102	109	105	103	104	106	2.9
20	132	133	130	124	134	129	134	132	131	3.3
30	162	161	160	155	166	161	163	163	161	3.2
40	193	193	193	189	198	193	194	194	193	2.4
50	220	219	219	217	224	219	219	221	220	2.1
60	240	230	239	238	245	239	241	243	239	4.4
70	261	260	262	259	267	265	266	267	263	3.2
80	293	294	294	291	301	298	298	297	296	3.3
90	339	341	343	340	347	345	344	346	343	2.9
95	372	370	379	371	382	381	377	380	376	4.8
EP	415	415	408	403	414	413	428	432	416	9.6

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

INDIVIDUAL LABORATORY RESULTS

Fuel 13

	Lab. 1		Lab. 2		Lab. 3		Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	1	2		
RVP, psi	13.9	14.1	14.0	14.1	14.3	14.3	14.5	14.7	14.2	0.27
API Gravity	62.4	62.8	62.1	62.3	62.2	62.2	61.8	61.2	62.1	0.47
$T_{V/L=20'}$ °F	110	115	110.0	109.5	110.3	109.9	109.0	109.0	110.3	1.94
Distillation (D86) T °F @ % Evap.										
IBP	87	84	88	84	76	79	77	75	81	5.1
5	95	91	90	-	81	84	-	-	88	5.6
10	105	102	105	98	99	103	90	96	100	5.1
20	126	123	127	124	125	129	117	121	124	3.7
30	155	153	158	152	156	159	147	152	154	3.8
40	188	187	192	187	188	190	180	187	187	3.5
50	216	215	220	217	218	219	208	216	216	3.7
60	238	238	240	238	241	242	231	239	238	3.3
70	259	257	262	258	260	262	254	263	259	3.0
80	291	291	296	292	294	295	286	300	293	4.2
90	341	339	351	344	342	344	341	354	344	5.3
95	369	369	383	-	373	375	-	-	374	5.8
EP	415	415	406	408	413	412	421	425	414	6.3

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

INDIVIDUAL LABORATORY RESULTS

Fuel 15

	Lab. 1		Lab. 2		Lab. 3		Lab. 4			
	1	2	1	2	1	2	1	2	Avg.	Std. Dev.
RVP, psi	15.2	15.1	15.2	15.4	15.3	15.4	15.5	15.9	15.4	0.25
API Gravity	63.4	63.1	63.1	63.3	62.8	63.0	62.6	62.5	63.0	0.32
$T_{V/L=20'}$ °F	110	112	104.6	104.6	105.3	105.3	104.6	104.3	106.3	2.95
Distillation (D86) T °F @ % Evap.										
IBP	80	80	82	75	76	80	72	76	78	3.4
5	84	86	-	-	77	83	-	-	82	3.9
10	98	98	96	86	90	98	94	94	94	4.3
20	119	119	121	114	105	122	122	124	118	6.1
30	149	148	151	143	134	152	155	157	149	7.3
40	184	183	187	180	171	185	189	190	184	6.0
50	214	213	216	209	202	215	216	217	213	5.0
60	236	235	238	231	226	240	236	239	235	4.6
70	257	256	260	255	248	260	259	264	257	4.7
80	290	286	292	285	283	293	300	301	291	6.7
90	349	334	356	343	335	340	355	355	346	9.1
95	361	379	-	-	366	371	-	-	369	7.7
EP	415	414	399	401	408	413	434	428	414	12.1

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

INDIVIDUAL LABORATORY RESULTS

Fuel 17

	Lab. 1		Lab. 2		Lab. 3		Lab. 4		Avg.	Std. Dev.
	1	2	1	2	1	2	1	2		
RVP, psi	16.1	16.2	16.5	16.5	16.6	16.4	16.2	16.2	16.3	0.18
API Gravity	64.3	64.4	63.7	64.0	63.8	63.4	63.5	63.5	63.8	0.38
$T_{V/L=20'}$ °F	110	110	99.0	99.4	100.1	102.4	98.2	98.2	102.2	5.02
Distillation (D86) T °F @ % Evap.										
IBP	76	84	79	77	80	78	75	76	78	2.9
5	-	-	-	-	-	-	-	-	-	-
10	92	95	90	-	93	96	-	-	93	2.4
20	113	115	115	108	115	118	105	107	112	4.7
30	142	143	145	136	144	149	135	139	142	4.7
40	179	179	184	176	180	187	174	177	180	4.2
50	211	211	214	208	213	218	207	210	212	3.5
60	234	234	236	231	238	241	231	236	235	3.4
70	256	255	261	255	261	265	253	257	258	4.0
80	286	286	292	285	293	300	282	290	289	5.7
90	335	335	349	339	344	354	-	-	343	7.8
95	-	-	-	-	-	-	-	-	-	-
EP	414	413	399	412	418	420	418	421	414	7.0

1982 CRC HIGH-TEMPERATURE DRIVEABILITY PROGRAM

INDIVIDUAL LABORATORY RESULTS

Fuel 20

	Lab. 1		Lab. 2		Lab. 3		Lab. 4			
	1	2	1	2	1	2	1	2	Avg.	Std. Dev.
RVP, psi	13.3	13.3	13.6	13.8	13.9	13.8	12.8	12.8	13.4	0.44
API Gravity	74.8	74.8	74.4	74.4	74.0	74.1	74.3	74.1	74.4	0.31
$T_{V/L=20'}$ °F	108	107	106.9	107.1	107.8	107.8	106.7	106.4	107.2	0.58
Distillation (D86) T °F @ % Evap.										
IBP	79	80	79	81	80	76	80	78	79	1.6
5	89	93	85	90	90	86	90	87	89	2.6
10	96	99	98	98	101	97	98	96	98	1.6
20	105	111	109	109	115	110	111	111	110	2.8
30	121	127	124	124	131	126	130	127	126	3.3
40	143	149	152	147	154	151	151	150	150	3.4
50	178	182	183	182	190	187	184	184	184	3.6
60	216	219	211	216	221	219	216	215	217	3.1
70	231	231	232	234	237	235	236	234	234	2.2
80	243	244	248	246	254	252	255	252	249	4.6
90	287	293	302	296	306	306	312	300	300	8.0
95	346	351	361	348	355	354	364	361	355	6.5
EP	409	407	410	408	414	409	432	428	415	9.8

APPENDIX D

TEST PROCEDURES
AND
DATA RATING SYSTEMS

I. TEST PROCEDURES

A. CRC Vapor Lock Test Technique

1. Drain gasoline tank and refill with six gallons of test fuel for the next test. Test fuel shall not be put in tanks more than 10 minutes before the start of the test.

2. Drive 20 miles at 55 mph for vehicle warm-up, establishing base total start time after 15 miles of operation.

3. Obtain baseline acceleration time on the track following 15 miles of warm up by accelerating from a stop, at light throttle, to reach 10 mph within 5 seconds. Then accelerate at the desired throttle position (wide-open throttle) to 70 mph, timing by stopwatch from 15 mph to 50, 60, and 70 mph, as indicated by speedometer. Record acceleration times and note surging or abnormal vehicle performance. Complete one lap around the track at 55 mph and return to wind shelter.

4. Park car in soak shed for 15 minutes with engine off. Obtain soak fuel sample in duplicate.

5. At end of soak period, start car using vehicle manufacturer's recommended procedure. Record start time to nearest 0.1 second and number of stalls. Idle for 5 seconds in neutral after the original start and any restarts, and record any abnormality in the stability of idle performance. Accelerate from soak shed as described in Item 6.

6. Turn headlights on. Obtain wide-open throttle acceleration time by accelerating from the soak shed at part throttle to reach 10 mph in 5 seconds, and then accelerate at wide-open throttle to 70 mph, recording time from 15 mph to 50, 60, and 70 mph. Record acceleration time and abnormal vehicle performance. In this technique, a transient and/or abnormal change in acceleration rate is called surge. The intensity of surge may vary, as described below:

   Satisfactory (S) - A rating indicating no malfunction. Some loss in acceleration may be measured, but no surging in the accepted understanding of the term may be recognized.

   Trace (T) - A rating that is just discernible to a test driver, or might not be observed by the casual driver.

   Moderate (M) - A rating that is judged to be probably noticeable to the average driver and definitely noticeable to the test driver. It is occasional in frequency and is associated with limited delays in acceleration rather than an actual decrease in speed.

Heavy (H) - A rating that is pronounced and judged to be obvious to any driver. It is persistent or constant in frequency and is associated with prolonged delays in acceleration or even actual decreases in speed level reached.

Lock (L) - That which completely stalls the engine over a stretch of at least 3/10 of a mile, or a period of time in excess of 20 seconds.

7. Complete two laps around the track at 60 mph, to restabilize temperatures.

8. Idle for 10 minutes in neutral in the soak shed. Record number of stalls. Obtain "idle" fuel sample in duplicate.

9. At end of idle period, accelerate from soak shelter as described in Item 6.

10. Complete one lap around the track at 60 mph, and return to fueling area.

11. Car volatility tolerances are to be defined only for the more critical condition (soak or idle); the remaining tests will be run as follows:

    a. If the fuel selected for the previous test was either too volatile or too low in volatility to determine whether the idle or the soak acceleration was the more critical, the soak and idle procedure shall be repeated on a new test fuel.

    b. If, during the preceding test, the soak acceleration is found to be appreciably more critical than the idle acceleration (>20% increase in acceleration time) with a fuel giving 25 to 75% loss in acceleration performance, the remaining tests will be run using only the soak procedures; otherwise the idle procedure will be used in all cases.

12. Continue testing with other fuels of different T-V/L levels to obtain curves of acceleration time from 15-50, 15-60, and 15-70 mph versus fuel volatility. To establish the vehicle limiting T-V/L data, a minimum of five fuels will be tested at the desired limiting condition (soak or idle). Fuels will be selected with the following objectives:

    a. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 50 and 100%.

    b. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 25 and 50%.

c. A fuel with sufficient volatility to cause acceleration time to 70 mph to increase between 10 and 25%.

d. A fuel with sufficient volatility to result in less than a 10% increase in acceleration time; or if minimum acceleration time exceeds 10%, two fuels giving essentially equal performance and differing by at least 4°F in the temperature for 20:1 V/L ratio (0.5 to 1.0 lb RVP).

e. A fuel estimated to give a 25% increase in acceleration time to 70 mph.

B. CRC Hot Start and Driveaway Test Technique

1. Drain fuel tank and fill with six gallons of test fuel.

2. Drive 20 miles at 55 mph for vehicle warm-up, establishing base total start time after running 15 miles of operation.

3. Pull into soak shed and idle in neutral for 10 minutes. Record idle speed and quality initially, after 5 minutes, and at the end of 10 minutes.

4. Back vehicle out of soak shed for approximately 30 feet and stop abruptly (10 ft./sec.^{2}). Record idle quality during 10-second idle in drive. Also record the number of stalls, and restart time, if any.

5. Accelerate from 0 to 30 mph at 5 ft./sec.^{2}, and stop abruptly (20 ft./sec.^{2}). Evaluate and record hesitation, stumble, surge, and stall.

6. Idle in drive for 15 seconds, recording idle quality.

7. Accelerate at 5 ft./sec.^{2} from 0-45 mph. Evaluate and record hesitation, stumble, surge, and stall.

8. Make four successive accelerations from 0-25 mph at 5 ft./sec.^{2}. Decelerate moderately, using brake, and idle for 15 seconds following each acceleration. Record hesitation, stumble, surge, stall, and idle speed and quality for each cycle of operation.

9. Immediately following the final 15-second idle in Item 8, accelerate at 8" Hg constant manifold vacuum from 0-55 mph. Record hesitation, stumble, surge, and stalls.

10. Complete 10 miles at 55 mph for temperature restabilization.

11. Pull into soak shed and idle in drive for one minute. Record idle speed and quality.

12. Turn off engine and soak for 20 minutes. Obtain duplicate fuel sample.

13. At the end of the soak period, with the transmission in park or neutral, set the throttle to manufacturer's recommendation. Engage the starter immediately after opening throttle. Do not pump the throttle before making the start. If the engine does not start after 15 seconds of cranking, depress throttle to floor board; crank an additional 15 seconds to check for overrich condition. If engine does not start, manipulate throttle as required to start engine. Record initial start time and detail any abnormal starting procedure.

14. When engine starts, allow it to accelerate to 1000 rpm before de-energizing start motor and releasing throttle to idle position. The engine must continue to run for one minute after the throttle is returned to idle to constitute a successful start and run test. If engine stalls, immediately repeat starting and idle procedure. If engine stalls four times in succession, increase idle speed as required to keep engine running. Evaluate and record idle quality and speed, number of stalls, and total starting time. Total starting time is the cumulative period of time the starter motor is engaged. The time interval that the engine is idling between stalls is not included in total starting time.

15. Repeat Items 4 through 9 and return to fueling area.

C. City Driveability Procedure

1. Stabilize engine and fuel system temperatures by driving 15 miles at 55 mph.

2. Drive 4 miles in "city" traffic, simulated as follows:

   a. Within each mile, stop 4 times for a 15-second idle, and at the end of each mile, idle for 30 seconds to record driveability problems. All idle soaks should be about 0.2 miles apart.

   b. Maximum car speed should be 20 mph.

   c. Accelerate very gently following each idle by dropping the engine vacuum at the start of an acceleration by 5" Hg below its idle value and hold the throttle at this position until the car reaches 20 mph.

The purpose of this portion of the test is to maximize engine heating and underhood temperatures. During this portion of the test, the driver should rate the severity of subjective problems, such as hesitation, stumble, surge, idle roughness, and backfire; and count the number of stalls.

3. Idle for 10 minutes in the soak shelter with the transmission in neutral or "Park" for safety. Appraise idle quality, record stalls and restart times if stalling occurs. Obtain fuel samples for RVP inspection.

4. Leave the soak shelter and make a 0-30 mph part-throttle (3" Hg manifold vacuum) acceleration. Observe severity of any acceleration problems including hesitation, stumble, and surge.

5. Drive 3 miles in city traffic per Step 2 above.

6. Park in a soak shelter for 20 minutes with key off. Observe hot start stalls and measure restart time. Obtain fuel samples for RVP inspection.

7. Repeat Step 4 above.

8. Compile driveability demerits for the cycle using an appropriate rating scale which weights problems according to their relative severity.

II. DATA RATING SYSTEMS

A. Vapor Lock Rating System

Reid vapor pressures measured on samples from the car tank for each road test were converted to equivalent $T_{V/L=20}$ based on the correlation established in Section IV. These values were then adjusted for the difference between ambient air temperature at the time of testing and the reference temperature of 95°F or 70°F as follows:

$$\text{Adjusted } T_{V/L=20} = \text{Actual } T_{VL=20} + K \begin{pmatrix} 95 \\ \text{or} \\ 70 \end{pmatrix} - \text{Air T}$$

$$K = 0.7$$

Printouts of complete vapor lock data for each car are presented in Appendix G. Because surge was encountered in many of the base accelerations*, average base acceleration times were taken from those accelerations judged to best represent base-line performance.

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* The frequency of surge in base accelerations in this program may be related to the slight delay at the end of the warm-up run needed to stop and allow the test crew to replace the warm-up driver.

Adjusted temperatures at V/L=20 were plotted against percent increase in car acceleration time at 15-50 mph, 15-60 mph, and 15-70 mph for all test sets. From these plots the most critical speed range and the limiting temperature at V/L=20 (hereafter described as $LT_{V/L=20}$) were determined for 25% as in previous programs*.

B. Driveability Demerit Rating System

Starting Time - Time recorded in seconds (hot-start time is the sum of times for initial start and all re-starts).

Stalls at Idle - Number of occurrences during each maneuver or time period.

Stalls, Driving - Number of occurrences during each maneuver.

Idle Roughness)
Backfire)
Hesitation) - Severity of any occurrence rated as trace (T), moderate (M), or heavy (H) during each maneuver.
Stumble)
Surge)

Weighted demerits are assigned to each malfunction as summarized below:

	Weighted Demerits**		
Starting time:	Seconds - 2.0 (but zero if negative)		
Stalls at idle:	8		
Stalls, driving:	32		
	T	M	H
Idle roughness	1	2	4
Backfire	6	12	24
Hesitation	6	12	24
Stumble	6	12	24
Surge	4	8	16

The total weighted demerit (TWD) value for each run was computed by adding the weighted demerits for the several malfunctions in each maneuver or idling period, subject to the following constraints:

---

* For example, reference, "1966 CRC Vapor Lock Tests," CRC Report No. 420.

** "Evaluation of a High Temperature Driveability Test Procedure - 1971 Yuma Program," CRC Report No. 455.

1. Only one driving stall was counted per maneuver.

2. No more than three idling stalls were counted per idling interval.

3. No more than five idling stalls were counted for the whole hot-start and idle procedure (lines 14-18 of data sheet).

4. For each maneuver or idling interval, only the one malfunction giving the highest weighted demerits was counted. Thus, if heavy hesitation (24 weighted demerits) and a stall were recorded in the same maneuver, only 32 weighted demerits were counted towards the TWD.

1982 CRC REGULAR VAPOR LOCK DATA SHEET

Car No.: _____ Car Make: _____

Date: _____ Run No. (Office Use): _____

Driver No.: _____ Observer: _____ No. in Car _____

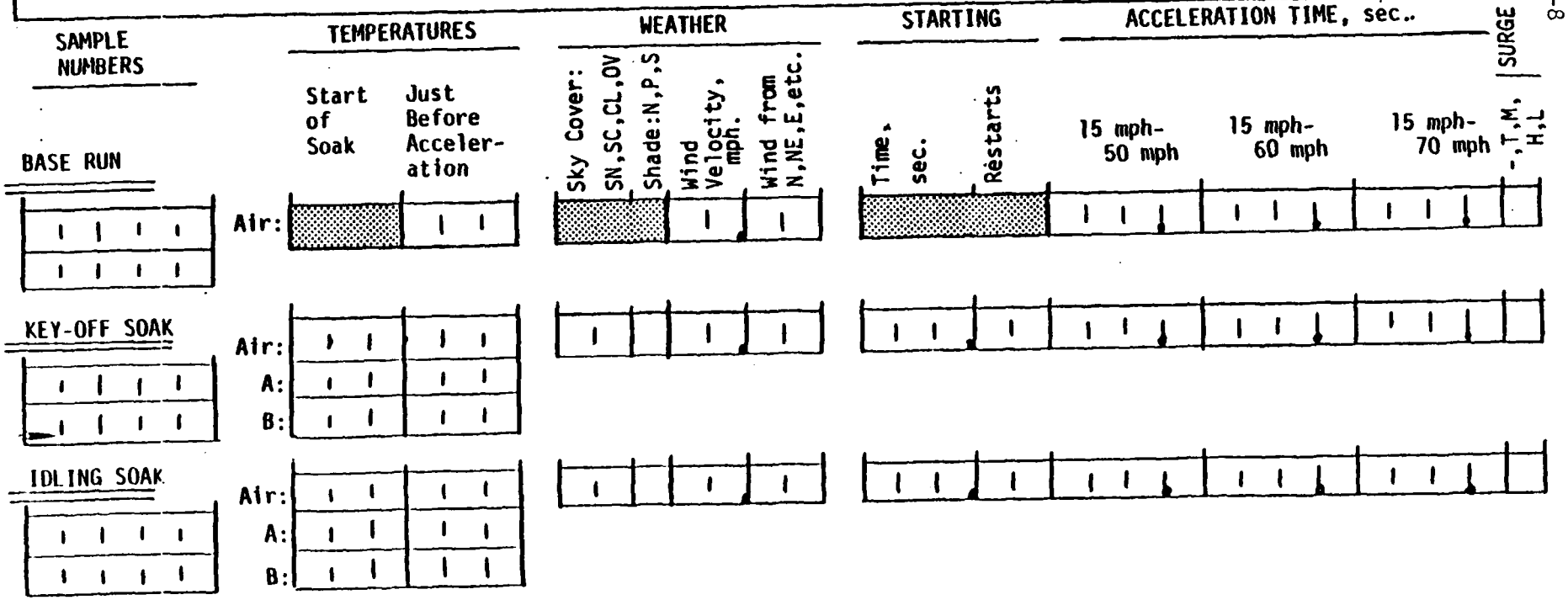
Fuel No.: _____ Gal: _____ Blend: _____

Gal: _____ Blend: _____

Temperature Probe at: A: _____ B: _____

	Start	End
Time, Base Run:		
Odometer, Base Run:		
Time, Key-Off Soak:		
Time, Idle Soak:		

COMMENTS:



1982 CRC ALTERNATE VAPOR LOCK DATA SHEET

Car No.: _____ Car Make: _____

Date: _____ Run No. (Office Use): _____

Driver No.: _____ Observer: _____ No. in Car _____

Fuel No.: _____ Gal: _____ Blend: _____

Gal: _____ Blend: _____

Temperature Probe at: A: _____ B: _____

	Start	End
Time, Base Run:		
Odometer, Base Run:		
Time, Key-Off Soak:		
Time, Idle Soak:		

COMMENTS:

D-9

SAMPLE NUMBERS		TEMPERATURES		WEATHER				STARTING		ACCELERATION TIME, sec.			
		Start of Soak	Just Before Acceleration	Sky Cover: SN,SC,CL,OV	Shade: N,P,S	Wind Velocity, mph.	Wind from N,NE,E,etc.	Time, sec.	Restarts	0 mph-30 mph	0 mph-50 mph	0 mph-60 mph	SURGE -,T,M,H,L
BASE RUN	Air:												
KEY-OFF SOAK	Air:												
	A:												
	B:												
IDLING SOAK	Air:												
	A:												
	B:												

1975 CRC TRAFFIC DRIVEAWAY DATA SHEET

Run No.: _____ Date: _____

Car No.: _____ Fuel No.: _____

Driver: _____ Observer: _____

Sample No.; End of Test _____

Line No.	Mode	Instruc. No.	Time of Day	Ambient Temp.	Overheat	Backfire	Starting Time; Sec.	Idle			Driving			
								RPM Range	Roughness	Stalls	Hesitation	Stumble	Surge	Stalls
1	Base Start Time	2												
2	10 min. idle — Initial	3												
3	10 min. idle — 5 min.	3												
4	10 min. idle — 10 min.	3												
5	Back-Up & Stop	4												
6	Accel 0-30 & st	5/6												
7	Accel 0-45	7												
8	Accel 0-25	8												
9	0-25	8												
10	0-25	8												
11	0-25	8												
12	Accel 0-60	9												
13	Idle Drive	11												
14	Hot Start	13												
15	1 min. idle	14												
16	1 min. idle	14												
17	1 min. idle	14												
18	1 min. idle	14												
19	Back-Up & Stop	4												
20	Accel 0-30 & st	5/6												
21	Accel 0-45	7												
22	Accel 0-25	8												
23	0-25	8												
24	0-25	8												
25	0-25	8												
26	Accel 0-60	9												
27	COMMENTS:													
28														

1982 CRC HOT WEATHER DRIVEABILITY DATA SHEET

Car No: _____ Car Make: _____ Fuel No: _____

Date: _____ Run No. (Office): _____ Gal: _____ Blend: _____

Driver No: _____ Observer: _____ No. in Car: _____ Gal: _____ Blend: _____

Temp Probes at A: _____ B: _____

-------Time & Odometer @Start of:---

	First Idle	10-min. Idle	20 min. Park
Time:			
Odometer:			

COMMENTS:

---------- WEATHER ----------

	Start, 0.0 mi	Idle, 10 min.	Park, 20 min.
Sky (SN, SC, CL, OV):			
Wind velocity, mph:			
Wind from (N,NE,E,etc.):			

Temperatures, First Idle

Air: | | |
A: | | |
B: | | |

IDLES, 15 sec/30 sec at *

GENTLE ACCELERATIONS

Mile Post: **0.0*** 0.2 0.4 0.6 0.8 **1.0*** 1.2 1.4 1.6 1.8 **2.0*** 2.2 2.4 2.6 2.8 **3.0*** 3.2 3.4 3.6 3.8

IDLE: Roughness; Stalls, #; Restarts, sec; Problem X

ACCELERATION: Hesitation; Stumble; Surge; Backfire; Stalls, #; Problem Y; Problem Z

Idle 10 min: IDLES, 15 sec/30 sec at *

PT Accel: GENTLE ACCELERATIONS

Park 20 min.

PT Accel.

Mile Post: 4.0 4.2* 4.4 4.6 4.8 **5.0*** 5.2 5.4 5.6 5.8 **6.0*** 6.2 6.4 6.6 6.8 **7.0**

Idle Sample #'s

Park Sample #'s

Temperatures, Start of Idle

Air: | | |
A: | | |
B: | | |

End of Idle

Air: | | |
A: | | |
B: | | |

Temperatures, Start of Park

Air: | | |
A: | | |
B: | | |

End of Park

Air: | | |
A: | | |
B: | | |

APPENDIX E

RATER COMPARISONS

CITY DRIVEABILITY PROCEDURE

APPENDIX E

RATER COMPARISONS - CITY DRIVEABILITY PROCEDURE

Past programs have shown large differences can exist among raters when evaluating vehicle driveability. To evaluate rater differences, data on cars driven by the same rater on the same fuels provide the best measures of biases. Ratings were obtained by each rater on the same fuel (No. 20) for only two vehicles:

Total Weighted Demerits

Vehicle	Rater 04	Rater 10	Rater 17	Average	St. Dev.	St. Dev. %*
10	917	874,766	530	755.7	201.4	27
12	884	793,761	812	824.3	54.6	7

*Standard deviation as percent of the mean.

Because of the inconsistencies indicated above and the small amount of data, rater severity values could not be developed to correct the TWD values for each vehicle/fuel combination.

Repeatability can best be measured by comparison tests performed by individual raters on the same vehicle/fuel combinations. Repeat ratings were completed by Rater 04 with three vehicles and by Rater 10 with two vehicles:

Rater	Car	Fuel	Run 1	Run 2	Average	St. Dev.	St. Dev., %
04	9	1	184	269	226.5	60.1	26.5
	14	1	112	48	80.0	45.3	56.6
	14	20	393	567	480.0	23.0	25.6
							Avg. = 36.2
10	10	20	874	766	820.0	76.4	9.3
	12	20	793	761	777.0	22.6	2.9
							Avg. = 6.1

Rater 04 may have had difficulty repeating ratings, or the particular cars Rater 04 ran for repeatability were not consistent in driveability. No repeatability data were available for Rater 17.

APPENDIX F

EFFECTS OF FUEL VOLATILITY CHANGES

CITY DRIVEABILITY PROCEDURE

APPENDIX F

EFFECTS OF FUEL VOLATILITY CHANGES - CITY DRIVEABILITY PROCEDURE

Total weighted demerit values obtained with the nineteen test fuels are shown in Table F-1 and illustrated in Figure F-1. As indicated, all vehicles were tested on at least two fuels, and every vehicle was tested on Fuel 20. As time permitted, vehicles with high demerit levels with Fuel 20 were tested using the vapor lock fuels. The test plan called for each car to run two vapor lock fuels bracketing the critical fuel. Because bracketing fuels varied for the different vehicles, an unbalanced data set was created, causing significant difficulty in model development.

Initially, to determine if changes in fuel volatility significantly affected TWD ratings, the data for vehicles tested on the extreme fuels were averaged and compared. In this data set, seven vehicles were tested on two fuels of widely different volatility (Vehicles 1, 4, 6, 9, 10, 12, and 14 on Fuels 1 and 20). Although these data are limited, the average TWD values follow the expected trend, increasing considerably as fuel volatility increases:

Fuel No.	Avg. TWD for Seven Vehicles	Inspections RVP, psi	Inspections T V/L=20	Inspections % 158
1	219	7.1	152.5	19.2
20	552	13.4	107.2	42.4

The analysis was expanded to include data for all fuels and all vehicles, rater biases, car biases, and ambient temperature. Ambient temperature was found to be insignificant in the temperature range tested and was excluded from further model development. The expanded model, excluding ambient temperature, was:

$$TWD = b_0 + b_1 C_1 + b_2 C_2 + \ldots + b_{19} C_{19} + b_{20} R_{04} + b_{21} R_{10} + b_{22} R_{17} + b_{23} T_{V/L=20} + b_{24} \%158 + b_{25} RVP$$

where:

C = dummy variable for Cars 1-19
R = dummy variable for Raters 04, 10, 17

The three fuel variables did not appear to be significant, indicating the combination of variables did not correlate with TWD. Rater coefficients were insignificant; therefore, the rater effect was eliminated from further model development. Correlation and regression coefficients are shown in Table F-II.

Fuel variables were next examined individually. The models used were developed using the common log of the TWD values. A constant of 10 was added to the TWD term to raise it above zero.

Models used for separately correlating RVP, %158, and $T_{V/L=20}$ were:

RVP:

$$\text{Log (TWD + 10)} = b_1 C_1 + b_2 C_2 + \ldots + b_{19} C_{19} + b_{25} (\text{RVP} - 12.4)$$

%158:

$$\text{Log (TWD + 10)} = b_1 C_1 + b_2 C_2 + \ldots + b_{19} C_{19} + b_{24} (\%158 - 33.7)$$

$T_{V/L=20}$:

$$\text{Log (TWD + 10)} = b_1 C_1 + b_2 C_2 + \ldots + b_{19} C_{19} + b_{23} (T_{V/L=20} - 120.3)$$

Results follow the expected trend -- TWD values increase as fuel volatility increases. All three fuel variables appear to be equally good predictors of hot-weather driveability and not just $T_{V/L=20}$, as for the 1975 CRC program. When using individual fuel variables, the model correlation coefficients improved. Correlation and regression coefficients are shown in Table F-II.

TABLE F-I

DRIVEABILITY RESULTS - CITY PROCEDURE

Car	Fuel: 1	3	5	6	8	9	10	11	13	14	17	20
	Total Weighted Demerits											
1	757	394	---	---	---	232	---	---	---	---	---	775
2	---	---	---	---	---	---	---	---	---	---	126	99
3	---	---	---	---	---	---	---	---	---	---	86	164
4	42*	---	---	---	---	---	---	866*	---	---	942*	891*
5	---	---	230	---	---	---	---	---	---	---	---	850
6	105	---	---	---	---	---	---	---	---	84	110	9
7	---	---	---	---	---	---	---	---	---	8	40	22
8	---	---	---	---	---	---	---	---	---	---	1	0
9	246	---	---	---	---	184/269	---	---	254	---	---	376/81
10	116	---	---	---	---	727	---	---	---	---	---	917/874/766/530*
11	---	48	---	---	---	---	---	---	---	---	---	60
12	175	---	660	---	578	---	---	---	---	---	---	884/793/761/812*
13	---	---	---	---	---	---	---	---	---	---	6	24
14	112/48	---	---	360	---	---	804	---	---	---	---	393/567
15	---	---	---	---	---	---	---	---	---	---	101	214
16	---	---	44*	---	---	---	---	---	---	---	---	445*
17	---	---	---	---	---	---	---	---	---	---	179	124/151*
18	---	---	---	---	---	---	---	---	---	---	43	61
19	---	---	62*	---	---	---	---	---	---	---	---	70*

** Rater indicated by: 04 - No additional marking
10 - Underlined
17 - Asterisked

TABLE F-11

REGRESSION EQUATIONS - TWD AS A FUNCTION OF FUEL PROPERTIES

Equation Form	Regression Coefficient									
	b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8	b_9
$TWD = b_0 + b_{1-19} C_{1-19} + B_{20-22} R +$ $+ b_{23} T_{V/L=20} + b_{24}\%158 + b_{25}RVP$	3385.7	0.0	-749.2	-448.4	173.6	-241.0	-689.0	-581.0	-613.4	-498.8
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{23} (T_{V/L=20}-120.3)$	--	2.7	1.9	2.1	2.7	2.7	1.9	1.4	1.0	2.4
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{24} (\%158-33.7)$	--	2.7	2.0	2.1	2.7	2.7	1.9	1.5	1.0	2.4
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{25} (RVP-12.4)$	--	2.7	1.9	2.1	2.7	2.7	1.9	1.4	1.0	2.4

NOTE: Underlined coefficients are not significant at 95% confidence.

TABLE F-II
(Continued)

REGRESSION EQUATIONS - TWD AS A FUNCTION OF FUEL PROPERTIES

Equation Form	Regression Coefficient									
	b_{10}	b_{11}	b_{12}	b_{13}	b_{14}	b_{15}	b_{16}	b_{17}	b_{18}	b_{19}
$TWD = b_0 + b_{1-19} C_{1-19} + B_{20-22} R + b_{23} T_{V/L=20} + b_{24}\%158 + b_{25}RVP$	27.5	-733.9	83.7	-742.3	-368.8	-664.5	-277.4	-488.1	-783.6	-462.0
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{23} (T_{V/L=20}-120.3)$	2.7	1.8	1.8	1.4	2.5	2.2	2.2	2.1	1.7	1.9
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{24} (\%158-33.7)$	2.7	1.8	2.8	1.4	2.5	2.2	2.2	2.1	1.8	1.9
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{25} (RVP-12.4)$	2.7	1.8	2.8	1.4	2.5	2.2	2.2	2.1	1.7	1.9

NOTE: Underlined coefficients are not significant at 95% confidence.

TABLE F-II
(Continued)

REGRESSION EQUATIONS - TWD AS A FUNCTION OF FUEL PROPERTIES

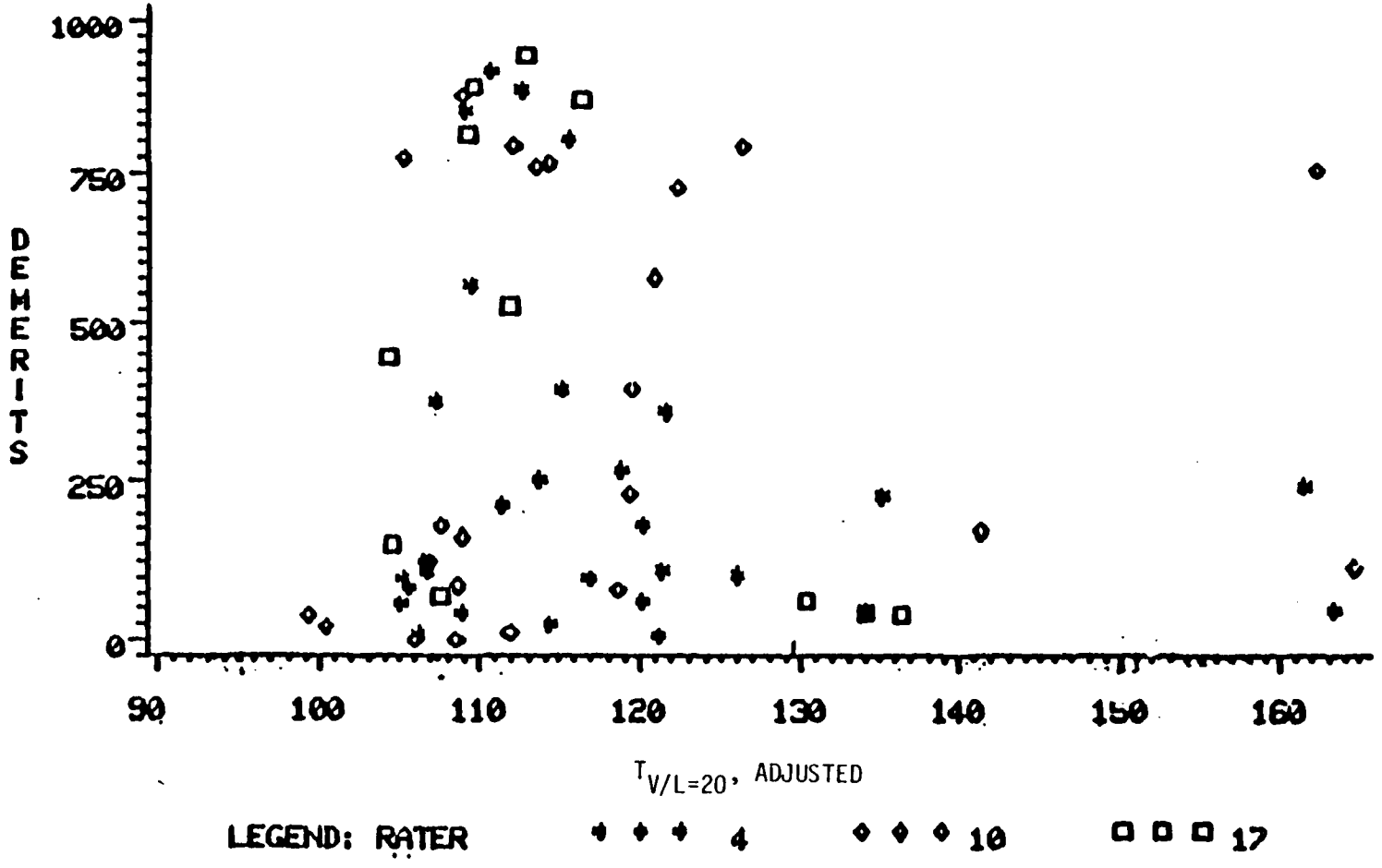
Equation Form	Regression Coefficient b_{20}	b_{21}	b_{22}	b_{23}	b_{24}	b_{25}	r^2	RMS
$TWD = b_0 + b_{1-19} C_{1-19} + B_{20-22} R + b_{23} T_{V/L=20} + b_{24}\%158 + b_{25}RVP$	206.6	0.0	-59.5	-20.4	4.7	-81.7	0.75	200.2
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{23} (T_{V/L=20}-120.3)$	--	--	--	-0.1	--	--	0.79	0.30
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{24} (\%158-33.7)$	--	--	--	--	0.12	--	0.78	0.31
$\log(TWD+10) = b_{1-19} C_{1-19} + b_{25} (RVP-12.4)$	--	--	--	--	--	0.06	0.79	0.30

NOTE: Underlined coefficients are not significant at 95% confidence.

FIGURE F-I

DRIVEABILITY

TWD VS $T_{V/L=20}$ ADJUSTED



A P P E N D I X G

1982 CRC VAPOR LOCK TEST DATA

1982 CRC Regular Vapor Lock, Hot

Car#:Ø1 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	921	1	5	9	1Ø6		1183	1226	1149	113	166	351	T
2	922	1	5	1Ø	1Ø9		1242	1195	1Ø97	113	188	349	
3	922	1	5	5	1Ø8		943	1366	1275	127	191	332	
4	922	1	5	1	1Ø8		697	1532	1441	13Ø	192	365	
5	924	1	5	1	93		697	1532	1546	134	197	373	
6	924	1	5	2	98		759	1488	1467	124	178	353	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	124.	185.	354.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
-1	49Ø	1Ø6	139	11Ø	1Ø5	15Ø	11Ø	1Ø55	SN		2	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	132	7	194	5	378	7		1187	1224	115Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	474	1Ø5	139	113	1Ø5	183	112	1Ø5Ø	SN			
2	466	1Ø9			1Ø9	177	1Ø9	1Ø9Ø	SN		2	
3	475	1Ø9	161	12Ø	1Ø9	181	12Ø	1Ø9Ø	SN		3	
4	457	1Ø8	142	123	1Ø8	186	122	1Ø8Ø	SN		2	
5	59	93	129	1Ø6	93	174	1Ø6	93Ø	SN			
6	88	98	135	114	99	178	11Ø	985	SN		3	
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	175	42	278	5Ø	559	58	H	1Ø98	1273	12Ø3
2	161	3Ø	25Ø	35	499	41	M	1197	1219	1121
3	146	18	238	28	527	49	M	997	1332	1234
4	146	18	229	24	481	36	M	898	1394	13Ø3
5	132	7	2Ø5	11	449	27		792	1465	1479
6	161	3Ø	27Ø	46	51Ø	44	H	1160	1238	1214
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: Ø2 CRC Fuel Data Comments: Run 1

Temp Adjustment =.70F/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	1ØØ4	17	7	14	95		1475	1Ø86	1Ø86	132	222	378	
2	1ØØ4	17	7	17	94		1644	1Ø2Ø	1Ø27	138	234	36Ø	
3	1ØØ5	17	7	1	89		697	1532	1574	144	242	422	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	138	233.	387.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	2ØØ	95			94			945	SC		2	1
2	182	94			92			93Ø	SC		3	1
3	234	9Ø			9Ø			9ØØ	SN		1	
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	1Ø6	-23	164	-3Ø	26Ø	-33		1514	1Ø7Ø	1Ø73
2	11Ø	-2Ø	17Ø	-27	23Ø	-41		1627	1Ø26	1Ø4Ø
3	112	-19	176	-24	3Ø4	-21		1241	1196	1231
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	159	94			93			935	SC			
2	198	92			91			915	SC			
3	243	9Ø			91			9Ø5	SN			
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	1Ø8	-22	164	-3Ø	262	-32		1441	1101	1111
2	1Ø6	-23	168	-28	256	-34		153Ø	1Ø63	1Ø88
3	11Ø	-2Ø	174	-25	298	-23		1224	1204	1236
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø:
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 3 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	921	12	16	9	1Ø6		1183	1226	1149	1Ø8	149	199	
2	922	12	16	14	99		1475	1Ø86	1Ø58	116	151	194	
3	922	12	16	16	1Ø9		1588	1Ø41	943.	1Ø8	154	212	
4	922	12	16	17	1Ø9		1644	1Ø2Ø	922.	11Ø	148	2Ø4	T
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	111.	151.	2Ø2.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	494	1Ø6	147	12Ø	1Ø5	17Ø	1Ø8	1Ø55	SNP		1Ø	
2	458	99	142	114	1ØØ	176	1Ø3	995	SNN		2	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	11Ø	Ø	151	Ø	2Ø5	1		1149	1244	1171
2	124	12	16Ø	6	2Ø7	2		1366	1134	1103
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	497	1Ø5	147	117	1Ø5	178	12Ø	1Ø5Ø	SNP			
2	499	1Ø1	147	118	1Ø2	174	115	1Ø15	SNN			
3	482	1Ø9	148	117	11Ø	164	115	1Ø95	SNN			
4	47Ø	1Ø9	15Ø	119	112	173	113	1105	SNN			
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	113	2	156	4	212	5	T	1Ø92	1276	12Ø6
2	121	1Ø	17Ø	13	225	11	T	1267	1182	1137
3	12Ø	9	17Ø	13	221	9	T	13Ø3	1164	1Ø63
4	118	7	17Ø	13	225	11		1355	1140	1Ø31
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 04 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	1ØØ6	17	7	11	93		13Ø1	1165	1179	138	218	342	
2	1Ø12	17	7	15	85		1532	1Ø62	1132	132	218	332	
3	1Ø13	17	7	17	85		1644	1Ø2Ø	1Ø9Ø	132		368	
4	1Ø13	17	7	15	87		1532	1Ø62	1118	136	218	364	
5	1Ø13	17	7	13	9Ø		1417	1111	1146	132	214	326	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	134	217	346.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	244	93	127	118	92	151	138	925	SN			2
2	286	85	12Ø	1Ø9	85	144	116	85Ø	SN			1
3	324	85	116	1Ø8	86	145	125	855	SN			3
4	346	88	118	11Ø	89	145	132	885	SN			2
5	333	9Ø	12Ø	112	89	151	129	895	SN			2
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø Time	%Inc	-15-6Ø Time	%Inc	-15-7Ø Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	146	9	234	8	362	5		1314	1159	1177
2	148	1Ø	25Ø	15	414	2Ø		1517	1Ø68	1138
3	258	93	538	148	79Ø	128	H	1701	1ØØØ	1Ø67
4	142	6	~~298~~	37	496	43	M	1554	1Ø54	1Ø99
5	148	1Ø	262	21	424	22		1469	1Ø88	1127
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

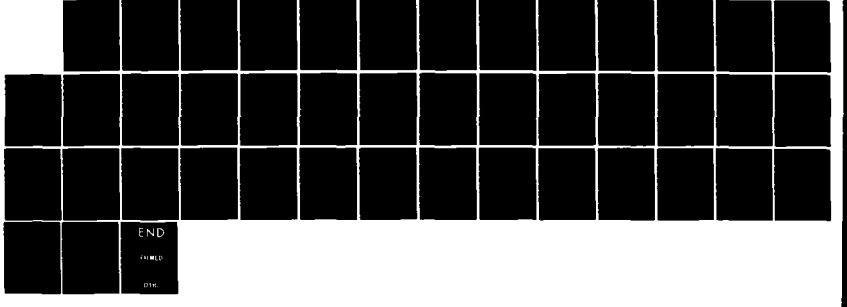
Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	225	91	126	121	9Ø	155	136	9Ø5	SN			
2	292	85	116	1Ø7	85	127	118	85Ø	SN			
3	319	87	118	11x	87	151	131	87Ø	SN			
								Ø				
								Ø				
								Ø				
								Ø				

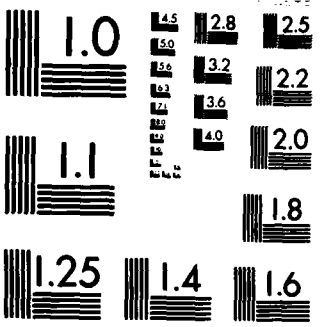
IDLE SOAK ACCELERATIONS

Run#	-15-5Ø Time	%Inc	-15-6Ø Time	%Inc	-15-7Ø Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	142	6	25Ø	15	378	9	T	1283	1174	1206
2	134	Ø	216	Ø	342	-1		1475	1Ø86	1156
3	148	1Ø	252	16	67Ø	93	T	1576	1Ø45	1101
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

AD-A155 413 TWO-TEMPERATURE VAPOR LOCK AND HIGH-TEMPERATURE 2/2
DRIVEABILITY PERFORMANCE OF 1982 PASSENGER VEHICLES(U)
COORDINATING RESEARCH COUNCIL INC ATLANTA GA DEC 84
UNCLASSIFIED CRC-538 F/G 13/6 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

1982 CRC Regular Vapor Lock, Hot

Car#: 05 CRC Fuel Data Comments: No
Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T20A	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	1005	17	7	12	91		1359	1138	1166	166	238	328	H
2	1006	17	7	1	91		697	1532	1560	124	206	294	M
3	1006	17	7	1	93		697	1532	1546	116	182	258	
4	1013	8	2	6	87		1004	1328	1384	115	178	264	
5	1013	8	2	8	89		1124	1258	1300	111	176	246	
6	1013	8	2	4	88		882	1405	1454	115	178	260	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	114.	179.	257	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	189	91	152		91	196		910	SN		2	1
2	232	91	151		92	192		915	SN		2	2
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T20A
1	152	33	220	23	308	20	H	1385	1126	1154
2	120	5	182	2	254	-1	M	1256	1188	1212
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	242	91	148		91	177		910	SN			
2	205	92	147		92	200		920	SN			
3	226	93	152		93	196		930	SN			
4	343	87	155	88	87	198	97	870	SN			
5	332	89	151	99	90	196	98	895	SN			1
6	325	88	154	99	87	195	95	875	SN			
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T20A
1	174	52	232	30	310	21	H	1335	1149	1177
2	190	66	254	42	332	29	H	1224	1204	1225
3	170	49	238	33	310	21	H	1250	1191	1205
4	137	20	206	15	290	13	M	1090	1278	1334
5	148	30	210	18	285	11	M	1198	1218	1257
6	117	2	181	1	269	5		981	1342	1395
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: 3-6
RVP is psix100; T020V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#:Ø6 CRC Fuel Data Comments: Run 4

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	921	1	5	9	1Ø6		1183	1226	1149	114	178	257	T
2	921	1	5	12	1Ø5		1359	1138	1Ø68	116	176	248	
3	922	1	5	16	95		1588	1Ø41	1Ø41	118	172	241	H
4	922	1	5	1	1ØØ		697	1532	1497	1Ø7	158	224	
5	922	1	5	17	11Ø		1644	1Ø2Ø	915.	144	199	276	H
							Ø	Ø	Ø				
							Ø	Ø.	Ø				
							Ø	Ø	Ø				
									Avg:	1Ø7	158	224	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	496	1Ø6			1Ø6	193	111	1Ø6Ø	SN		5	
2	473	1Ø5	149	118	1Ø5	19Ø	1Ø8	1Ø5Ø	SN		3	
3	495	95	143	1Ø6	97	185	1Ø3	96Ø	SN		3	
4	454	1ØØ	146	117	1Ø2	183	112	1Ø1Ø	SN		2	
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	116	8	177	12	252	13	H	1142	1248	1171
2	116	8	172	9	241	8	M	12Ø4	1215	1145
3	119	11	181	15	257	15	H	1439	1Ø1	1Ø94
4	116	8	173	9	237	6	H	11ØØ	1272	123Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	491	1Ø6	149	119	1Ø6	185	113	1Ø6Ø	SN			
2	477	1Ø5	148	115	1Ø5	18Ø	11Ø	1Ø5Ø	SN			
3	467	99	149	1Ø9	99	175	1Ø8	99Ø	SN			
4	479	1Ø3	15Ø	116	1Ø3	176	116	1Ø3Ø	SN			
5	462	1Ø7	153	1Ø6	1Ø8	182	1Ø6	1Ø75	SN			
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	125	17	193	22	272	21	M	1Ø65	1292	1215
2	118	1Ø	18Ø	14	252	13	T	1121	126Ø	1190
3	116	8	179	13	258	15	T	1312	116Ø	1132
4	119	11	176	11	252	13	T	1Ø36	1309	1253
5	129	21	216	37	35Ø	56	H	1371	1132	1Ø45
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: 4 only.
RVP is psix1ØØ; T32ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 7 CRC Fuel Data Comments: Runs 3,5

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	921	12	16	9	106		1183	1226	1149	158	232	348	M
2	922	12	16	7	97		1064	1293	1279	142	212	312	M
3	922	12	16	1	103		697	1532	1476	142	210	301	
4	922	12	16	16	108		1588	1041	950.	210	289	466	H
5	922	12	16	14	111		1475	1086	974.		255	363	M
6	923	17	16	13	99		1417	1111	1083	158	230	315	H
7	923	17	16	14	103		1475	1086	1030	180	251	357	H
							0	0	0				
									Avg:	142	210	301	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	486	106	143	108	106	169	108	1060	SNP		1	
2	480	97	133	108	99	163	107	980	SNN		1	
3	459	103	144	117	105	172	116	1040	SNN		2	
4	488	108	145	106	107	176	108	1075	SNN		3	
5	30	111	145	110	111	173	107	1110	SNN		4	1
6	95	99	137	105	100	165	104	995	SN		3	1
7	21	103	140	106	105	173	106	1040	SN		3	

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	149	5	222	6	322	7	M	1141	1249	1172
2	130	-8	195	-7	289	-4		1057	1297	1276
3	144	1	212	1	307	2	T	777	1476	1413
4	225	58	330	57	474	57	H	1404	1117	1029
5	193	36	258	23	377	25	M	1299	1166	1054
6	159	12	232	10	329	9	H	1342	1146	1114
7	175	23	251	20	368	22	H	1389	1124	1061

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	498	106	144	114	106	169	114	1060	SNP			
2	453	99	134	112	99	172	111	990	SNN			
3	163	106	142	118	107	174	119	1065	SNN			
4	471	108	145	112	108	169	114	1080	SNN			
5	19	111	142	114	110	175	114	1105	SNN			
6	97	101	138	111	101	162	109	1010	SN			
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	141	-1	212	1	300	0	M	1072	1288	1211
2	161	13	225	7	318	6	M	1024	1316	1288
3	156	10	221	5	320	6	M	768	1482	1401
4	190	34	260	24	363	21	M	1240	1196	1105
5	208	46	288	37	410	36	H	1153	1242	1134
6	155	9	238	13	343	14	H	1247	1192	1150
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: Run 3 only
RVP is psix100; T020V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 08 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	922	4	10	15	103		1532	1062	1006	91	137	202	
2	922	4	10	17	108		1644	1020	929.	94	139	208	
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
									Avg:	92.5	138	205	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	456	103			105			1040	SN		2	
2	469	108			108			1080	SN		7	1
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	91	-2	139	1	203	-1		1314	1159	1096
2	92	-1	136	-1	204	0		1363	1136	1045
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	483	106			107			1065	SN			
2	487	109			110			1095	SN			
								0				
								0				
								0				
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	92	-1	134	-3	201	-2		1190	1222	1142
2	95	3	141	2	220	7		1169	1234	1132
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T020V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: Ø9 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	922	4	1Ø	4	112		882	1405	1286	152	23Ø	374	
2	923	17	16	7	1Ø5		1Ø64	1293	1223	14Ø	21Ø	36Ø	
3	923	17	16	9	1Ø6		1183	1226	1149	144	21Ø	35Ø	
4	924	17	16	13	93		1417	1111	1125	14Ø	21Ø	361	
5	924	17	16	11	94		13Ø1	1165	1172	138	2Ø5	349	
6	924	17	16	9	1Ø1		1183	1226	1184	145	212	342	
7							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	143.	213.	356	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	472	112			111			1115	SN			
2	66	1Ø5	131	125	1Ø5	156	144	1Ø5Ø	SN		4	
3	31	1Ø6	131	123	1Ø6	155	143	1Ø6Ø	SN		4	
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø Time	%Inc	-15-6Ø Time	%Inc	-15-7Ø Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	15Ø	5	225	6	377	6		9Ø4	1391	1275
2	15Ø	5	23Ø	8	398	12	T	1Ø72	1288	1218
3	152	6	249	17	398	12	M	1156	1241	1164
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	7	111			111			1110	SN			
2	18	1Ø5	147	125	1Ø6	169	152	1Ø55	SN			
3	1	1Ø7	133	122	1Ø7	17Ø	152	1Ø7Ø	SN			
4	43	93	115	111	93	162	142	93Ø	SC			
5	85	94	122	116	94	164	147	94Ø	CL			
6	76	1Ø1	126	126	1Ø1	169	149	1Ø1Ø	CL			
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø Time	%Inc	-15-6Ø Time	%Inc	-15-7Ø Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	164	15	244	15	4Ø5	14		868	1414	13Ø2
2	154	8	227	7	382	7		1Ø36	13Ø9	1236
3	15Ø	5	275	29	415	17	H	1Ø5	1269	1185
4	228	59	392	84	558	57	H	1413	1113	1127
5	16Ø	12	41Ø	93	551	55	H	1331	1151	1158
6	152	6	265	25	417	17	M	1169	1234	1192
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 10 CRC Fuel Data Comments: No Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	924	17	16	9	98		1183	1226	1205	120	160	252	
2	924	17	16	4	101		882	1405	1363	114	167	245	
3	924	17	16	1	104		697	1532	1469	112	163	237	
4	1004	2	8	2	94		759	1488	1495	93	129	185	T
5	1004	2	8	1	93		697	1532	1546	95	133	210	T
6	1014	17	7	3	91		821	1445	1473	98	146	220	
							Ø	Ø	Ø				
							Avg 1,2,3=			115.	163.	245.	
							Avg 4,5,6=			95.3	136	205	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	84	98	132	127	99	154	134	985	CL		2	
								Ø				
								Ø				
4	170	95	120	118	95	140	116	950	SC		3	
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	115	Ø	258	58	363	48	H	1197	1219	1194
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
4	109	14	155	14	236	15	T	1206	1214	1214
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	64	100	134	130	100	159	1449	1000	CL			
2	74	101	137	133	101	169	158	1010	CL			
3	29	104	143	133	105	169	158	1045	CL			
4	154	94	120	121	94	145	139	940	SC			
5	186	93	118	118	92	147	140	925	SC			
6	315	91	122	124	91	148	139	910	SN			
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	132	14	478	193	518	112	H	1148	1245	1210
2	162	40	512	213	720	194	H	1088	1279	1237
3	122	6	203	24	357	46	M	881	1406	1339
4	103	8	151	11	264	29	M	1181	1227	1234
5	96	1	144	6	246	20	M	1248	1192	1209
6	104	9	148	9	222	8		884	1404	1432
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 11 CRC Fuel Data Comments: Run 1

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	924	17	16	9	102		1183	1226	1177	174	276	409	
2	924	17	16	1	106		697	1532	1455	162	256	357	
3	1004	17	7	3	92		821	1445	1466	142	216	310	
4	1004	17	7	5	90		943	1366	1401	138	210	300	
5	1005	17	7	8	91		1124	1258	1286	146	224	330	
6	1006	17	7	10	89		1242	1195	1237	138	216	306	
7	1006	17	7	7	92		1064	1293	1314	138	214	304	
8	1012	17	7	7	87		1064	1293	1349	140	216	304	
9	1012	17	7	10	84		1242	1195	1272	142	228	330	
10	1013	17	7	3	87		821	1445	1501	142	216	310	
11	1013	17	7	13	90		1417	1111	1146	142	222	312	
12	1013	17	7	15	89		1532	1062	1104	140	218	312	
									Avg:	141.	218	312.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	68	102		139	103		154	1025	CL		2	
2	36	106		140	107		152	1065	CL		1	
3	177	92	123	122	93	192	143	925	SC		1	
4	213	90	125	122	89	194	139	895	SC		2	
5	236	91	150	128	91	195	139	910	SN		1	
6	231	90			91	200	147	905	SN		2	
7	224	92	138	125	93	198	149	925	SN		1	
8	273	87	124	114	86	194	133	865	SN		1	
9	312	84	114	120	84	179	126	840	SN		1	
10	322	87	116	119	87	194	134	870	SN		2	
11	318	89	118	120	89	193	145	890	SN		2	
12	323	89	124	119	88	193	143	885	SN		2	

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	174	24	287	32	423	36		1088	1279	1226
2	172	22	310	42	537	72		774	1478	1397
3	152	8	236	8	370	19		1228	1202	1220
4	134	-5	216	-1	332	6		1260	1186	1224
5	152	8	262	20	434	39		1254	1189	1217
6	160	14	262	20	414	33		1317	1158	1189
7	154	9	252	16	396	27		1275	1178	1196
8	142	1	236	8	394	26		1135	1252	1312
9	148	5	238	9	402	29		1319	1157	1234
10	148	5	228	5	340	9		889	1400	1456
11	152	8	234	7	362	16		1464	1091	1133
12	158	12	240	10	358	15		1611	1032	1077

NOTES: Runs included in base acceleration time averages: 3-10
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 11 CRC Fuel Data Comments: Run 1

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -50	-6Ø	-7Ø	Surg
-1	924	17	16	9	1Ø2		1183	1226	1177	174	276	409	
2	924	17	16	1	1Ø6		697	1532	1455	162	256	357	
3	1ØØ4	17	7	3	92		821	1445	1466	142	216	31Ø	
4	1ØØ4	17	7	5	9Ø		943	1366	14Ø1	138	21Ø	3ØØ	
5	1ØØ5	17	7	8	91		1124	1258	1286	146	224	33Ø	
6	1ØØ6	17	7	1Ø	89		1242	1195	1237	138	216	3Ø6	
7	1ØØ6	17	7	7	92		1Ø64	1293	1314	138	214	3Ø4	
8	1Ø12	17	7	7	87		1Ø64	1293	1349	14Ø	216	3Ø4	
9	1Ø12	17	7	1Ø	84		1242	1195	1272	142	228	33Ø	
1Ø	1Ø13	17	7	3	87		821	1445	15Ø1	142	216	31Ø	
11	1Ø13	17	7	13	9Ø		1417	1111	1146	142	222	312	
12	1Ø13	17	7	15	89		1532	1Ø62	1104	14Ø	218	312	
									Avg:	141.	218	312.	

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	9Ø	1Ø4	14Ø	143	1Ø4		173	1Ø4Ø	CL			
2	87	1Ø7		137	1Ø7		175	1Ø7Ø	CL			

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1		Ø		Ø		Ø		998	1332	1269
2	198	41	3Ø3	39	434	39		762	1486	14Ø2

NOTES: Runs included in base acceleration time averages: 3-1Ø
RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 12 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	922	1	5	9	112		1183	1226	1107	109	163	224	
2	923	1	5	9	95		1183	1226	1226	104	154	207	
3	923	1	5	5	97		943	1366	1352	101	149	204	
4	923	1	5	7	99		1064	1293	1265	97	142	197	
5	923	1	5	8	104		1124	1258	1195	109	163	219	
							0	0	0				
							0	0	0				
							0	0	0				
									Avg:	104	154.	210.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	14	112	146	130	111	174	125	1115	SN		9	
								0				
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1		108		162		223		1062	1294	1178
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	4	111	148	132	111	184	158	1110	SN			
2	92	95	136	124	95	174	151	950	SN			
3	28	97	140	129	97	174	148	970	SN			
4	93	99	143	127	100	169	148	995	SN			
5	98	105	142	131	105	178	151	1050	SN			
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	115	11	304	97	423	101	H	965	1352	1240
2	112	8	231	50	327	56	H	1164	1236	1236
3	107	3	158	2	219	4		1006	1327	1313
4	106	2	153	-1	242	15	M	1071	1288	1257
5	109	5	162	5	316	50	H	1069	1290	1220
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 13 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	922	1	5	9	111		1183	1226	1114	89	131	172	
2	923	1	5	9	96		1183	1226	1219	84	125	182	
3	923	1	5	13	98		1417	1111	1Ø9Ø	97	139	.93	
4	923	1	5	15	1Ø1		1532	1Ø62	1Ø2Ø	98	141	197	T
5	923	1	5	17	1Ø5		1644	1Ø2Ø	95Ø.	93	133	188	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	92.2	134.	186.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	44	111	147		11Ø	16Ø		1105	SN		2	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	97	5	142	6	196	5		1104	127Ø	1161
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	5	11Ø	138		11Ø	161		11ØØ	SN			
2	99	97	125		97	15Ø		97Ø	SN			
3	37	99	13Ø		99	15Ø		99Ø	SN			
4	[illegible]	1Ø1	13Ø		1Ø1	152		1Ø1Ø	SN			
5	23	1Ø5	134		1Ø5	152		1Ø5Ø	SN			
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	11Ø	19	161	2Ø	225	21	T	998	1332	1227
2	1ØØ	8	145	8	2Ø3	9		1185	1225	1211
3	112	21	167	25	227	22		1289	1171	1143
4	111	2Ø	16Ø	2Ø	224	2Ø	T	1364	1135	1Ø93
5	114	24	167	25	226	21		1327	1153	1Ø83
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 14 CRC Fuel Data Comments: No
Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	922	16	12	9	11Ø		1183	1226	1121	84	13Ø	21Ø	
2	923	17	16	5	98		943	1366	1345	9Ø	138	224	
3	923	17	16	7	1Ø1		1064	1293	1251	99	13Ø	223	
4	923	17	16	9	1Ø5		1183	1226	1156	92	134	22Ø	
5	923	17	16	8	1Ø6		1124	1258	1181	98	138	227	
6	924	17	16	9	93		1183	1226	1240	95	139	23Ø	
7	1Ø14	17	7	8	9Ø		1124	1258	1293	84	132	224	
							Ø	Ø	Ø				
									Avg:	91.7	134.	223.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	33	11Ø	162	13Ø	11Ø	216	172	11ØØ	SN		3	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	87	-5	215	6Ø	3ØØ	35	M	1148	1245	1140
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp Air	@ Start- TcA	TcB	-Tmp Air	@ End- TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	45	11Ø	141	131	11Ø	194	16Ø	11ØØ	SN			
2	38	98	138	121	99	184	15Ø	985	SN			
3	94	1Ø1	14Ø	124	1Ø1	173	146	1Ø1Ø	SN			
4	46	1Ø5	134	125	1Ø5	163	157	1Ø5Ø	SN			
5	1Ø	1Ø6	135	126	1Ø7	188	153	1Ø65	SN			
6	6	93	131	113	93	183	147	93Ø	SN			
7	38Ø	9Ø	125	112	9Ø	167	143	9ØØ	SN			

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	9Ø	-2	276	1Ø5	371	67	H	1Ø58	1296	1191
2	94	2	142	6	257	15	M	968	135Ø	1326
3	96	5	141	5	241	8		1Ø63	1293	1251
4	155	69	33Ø	145	42Ø	89	H	1162	1237	1167
5	1ØØ	9	24Ø	79	357	6Ø	H	1113	1264	1184
6	97	6	194	44	317	42	H	1183	1226	124Ø
7	92	Ø	14Ø	4	234	5		118Ø	1228	1263

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; t@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are secs.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 15 CRC Fuel Data Comments: Run 7

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	923	5	15	9	1Ø6		1183	1226	1149	99	192	271	T
2	924	5	15	14	93		1475	1Ø86	11ØØ	83	138	192	
3	924	5	15	16	97		1588	1041	1Ø27	95	145	2Ø8	
4	924	5	15	17	1ØØ		1644	1Ø2Ø	985.	115	167	242	H
5	924	5	15	6	1Ø3		1ØØ4	1328	1272	92	142	2Ø1	T
6	1ØØ4	1	8	17	91		1644	1Ø2Ø	1Ø48	97	148	21Ø	T
7	1ØØ4	1	8	15	94		1532	1Ø62	1Ø69	93	139	195	T
8	1ØØ4	1	8	16	91		1588	1041	1Ø69	87	138	189	
9	1Ø12	1	8	8	86		1124	1258	1321	95	143	2Ø7	T
1Ø	1Ø12	1	8	1Ø	85		1242	1195	1265	87	134	194	T
									Avg:	91.1	141.	2ØØ.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	35	1Ø6	142	116	1Ø7	176	13Ø	1Ø65	SN		4	
6	193	91	123	1Ø1	92	164	115	915	SC		2	
7	185	93	12Ø	1Ø2	92	163	94	925	SC		2	

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA	
1	98	8	175	24	245	23	T	1Ø93	1276	1195	
6	1Ø2	12	15Ø	6	2Ø8	4	T	15Ø4	1Ø74	1Ø98	
7	191	11Ø	296	11Ø	419	11Ø	L!!	1386	1125	1143	Proxy times!!

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	26	1Ø7	138	1Ø8	1Ø7	184	12Ø	1Ø7Ø	SN			
2	47	93	131	11Ø	93	17Ø	111	93Ø	CL			
3	86	97	128	116	97	166	123	97Ø	CL			
4	51	1ØØ	135	127	1ØØ	175	131	1ØØØ	CL			
5	15	1Ø3	142	113	1Ø4	191	119	1Ø35	CL			
6	187	93	122	111	94	163	117	935	SC			
7	184	93	124	1ØØ	93	171	93	93Ø	SC			
8	21Ø	91	121	1Ø7	9Ø	162	87	9Ø5	SC			
9	337	86	117		86	176		86Ø	SN			
1Ø	344	85	1Ø9		84	174		845	SN			

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	119	31	2Ø7	47	281	41	M	1Ø45	13Ø4	122Ø
2	1Ø1	11	154	9	21Ø	5	T	14Ø9	1115	1129
3	96	5	15Ø	6	2Ø2	1		1484	1Ø82	1Ø68
4	1Ø2	12	161	14	227	14	M	1384	1126	1Ø91
5	114	25	176	25	244	22	M	1Ø13	1323	1263
6	138	51	189	34	247	24	H	1352	1141	1151
7	1Ø3	13	155	1Ø	213	7	T	1265	1183	1197
8	1Ø2	12	15Ø	6	2Ø6	3	M	1428	1106	1138
9	95	4	146	4	21Ø	5	T	1188	1223	1286
1Ø	94	3	142	1	197	-1	T	13Ø3	1164	1238

NOTES: Runs included in base acceleration time averages: 2,3,5-1Ø
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Hot

Car#: 16 CRC Fuel Data Comments: Runs 1,8

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	924	5	15	9	101		1183	1226	1184	124	183	281	
2	924	5	15	4	104		882	1405	1342	125	188	277	
3	924	5	15	6	107		1004	1328	1244	123	184	268	
4	1004	2	8	6	89		1004	1328	1370	124	179	257	T
5	1005	2	8	4	91		882	1405	1433	127	185	270	T
6	1005	2	8	9	90		1183	1226	1261	131	189	286	T
7	1006	2	8	2	90		759	1488	1523	126	184	277	T
8	1006	2	8	1	92		697	1532	1553	126	183	272	M
9	1013	2	8	5	89		943	1366	1408	127	184	303	
10	1014	2	8	6	89		1004	1328	1370	123	179	273	T
									Avg:	126.	184.	276.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	22	101	134	136	101	152	154	1010	CL		4	
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	132	5	253	38	358	30	M	1140	1249	1207
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	465	102	136	140	103	160	164	1025	CL			
2	468	104	142	144	105	165	171	1045	CL			
3	60	106	140	143	106	162	168	1060	CL			
4	203	89	124	135	88	148	151	885	SC			
5	230	91	127	132	91	152	155	910	SN			
6	215	91	128	138	91	152	158	910	SN			
7	259	90	124	130	91	155	159	905	SN			
8	252	92	127	132	92	155	165	920	SN			
9	314	89	124	133	89	157	159	890	SN			
10	339	89	125	135	89	149	156	890	SN			

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A	
1	129	3	195	6	>873	200		1078	1284	1232	Proxy %Inc.!!
2	132	5	194	6	356	29	M	947	1363	1297	
3	129	3	200	9	378	37	M	1018	1320	1243	
4	131	4	192	4	313	13	M	1275	1178	1224	
5	130	4	408	122	513	86	H	1274	1179	1207	
6	134	7	199	8	575	108	L	1255	1188	1216	
7	129	3	191	4	550	99	H	1289	1171	1203	
8	128	2>1050		200		200	L!!	1279	1176	1197	Proxy %Inc.!!
9	131	4	201	9	308	11		1036	1309	1351	
10	122	-3	182	-1	276	0	T	1083	1282	1324	

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 17 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	1013	8	2	17	90		1644	1020	1055	92	143	231	
2	1014	8	1	17	90		1644	1020	1055	110	168	280	
3	1014	8	2	15	90		1532	1062	1097	109	163	266	
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
									Avg:	104.	158	259	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start Air	TcA	TcB	-Tmp @ End Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	350	90	101		90	124		900	SN		32	3
2	372	90	110		90	136		900	SN		19	
3	320	90	111		90	131		900	SN		4	
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50 Time	%Inc	-15-60 Time	%Inc	-15-70 Time	%Inc	Surg	RVP	T20	T20A
1	109	5	167	6	277	7	T	1684	1006	1041
2	125	21	193	22	319	23		1627	1026	1061
3	124	20	189	20	313	21		1510	1071	1106
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start Air	TcA	TcB	-Tmp @ End Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	301	90	105		90	127		900	SN			
2	373	90	108		90	140		900	SN			
3	348	91	110		91	134		910	SN			
								0				
								0				
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	-15-50 Time	%Inc	-15-60 Time	%Inc	-15-70 Time	%Inc	Surg	RVP	T20	T20A
1	106	2	162	3	273	5	T	1591	1039	1074
2	131	26	204	29	351	36		1516	1069	1104
3	126	22	190	20	305	18		1440	1101	1129
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 18 CRC Fuel Data Comments: Run 1

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	1006	8	2	17	90		1644	1020	1055	96	145	217	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
								Avg:		96	145	217	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	282	90	113		89	151		895	SN		4	1
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	103	7	153	6	231	6	T	1516	1069	1107
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	256	90	112		90	124		900	SN			
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	90	-6	131	-10	217	Ø		1617	1030	1065
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Hot

Car#: 19 CRC Fuel Data Comments: Runs 6,7

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	924	S	15	9	106		1183	1226	1149	141	212	317	
2	1005	1	8	15	90		1532	1062	1097	124	194	301	T
3	1005	1	8	13	91		1417	1111	1139	124	200	317	T
4	1005	1	8	11	91		1301	1165	1193	131	206	334	T
5	1006	1	8	7	90		1064	1293	1328	120	196	298	T
6	1006	1	8	1	91		697	1532	1560	107	179	294	T
7	1006	1	8	1	93		697	1532	1546	129	198	303	T
8	1012	1	8	6	85		1004	1328	1398	108	162	277	T
9	1012	1	8	3	84		821	1445	1522	122	185	290	T
10	1013	1	2	1	85		697	1532	1602	111	178	298	
11	1013	1	2	2	87		759	1488	1544	112	172	277	T
									Avg:	121.	189.	301.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	53	106	134		107	172		1065	CL		2	

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	128	6	212	12	335	11		1177	1229	1149

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	24	107	126		107	168		1070	CL			
2	214	90	116	131	90	164	167	900	SN			
3	227	91	114	129	91	162	167	910	SN			
4	249	91	113	126	91	168	172	910	SN			
5	260	90	119	135	90	164	167	900	SN			
6	255	92	113	126	92	165	167	920	SN			
7	258	93	115	134	93	166	168	930	SN			
8	341	85	107	122	85	170	167	850	SN			
9	342	84	106	119	84	169	167	840	SN			
10	311	85	106	169	86	127	172	855	SN			
11	340	87	113	169	88	133	171	875	SN			

IDLE SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	184	52	264	39	378	26	H	1134	1253	1169
2	220	82	315	66	475	58	H	1508	1072	1107
3	219	81	323	71	496	65	H	1488	1080	1108
4	199	65	281	48	456	52	H	1381	1127	1155
5	199	65	283	50	416	38	H	1258	1187	1222
6					372	24	H	1272	1180	1201
7	176	46	254	34	391	30	H	1258	1187	1201
8	137	13	232	23	396	32	T	1088	1279	1349
9	139	15	223	18	362	20	T	912	1385	1462
10	121	0	195	3	309	3		798	1461	1528
11	129	7	207	9	339	13	T	826	1442	1495

NOTES: Runs included in base acceleration time averages: All
RVP is psi*100; T@20V/L & Avg Air Temp are deg F*10;
Acceleration times are sec.*10

1982 CRC Regular Vapor Lock, Cool

Car#: Ø1 CRC Fuel Data Comments: No Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations- -5Ø	-6Ø	-7Ø	Surg
1	928	1	5	12	67		1359	1138	1159	117	177	321	
2	928	1	5	3	72		821	1445	1431	121	184	334	
3	928	1	5	4	8Ø		882	1405	1335	12Ø	189	346	
4	929	1	5	5	7Ø		943	1366	1366	126	188	337	
5	929	1	5	6	77		1ØØ4	1328	1279	125	188	352	
6	929	1	5	8	83		1124	1258	1167	124	184	351	
7	93Ø	1	5	6	66		1ØØ4	1328	1356	128	197	387	
8	1Ø12	1	8	7	76		1Ø64	1293	1251	125	192	376	T
									Avg:	124.	188.	349.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	414	67	11Ø	7Ø	69	127	75	68Ø	SN		2	
2	445	72	111	87	74	133	85	73Ø	SN		3	1
3	419	8Ø	115	95	8Ø	138	92	8ØØ	SN		3	
4	1Ø7	7Ø	1Ø5	78	71	1Ø8	75	7Ø5	SN			
5	12Ø	77	111	87	79	137	84	78Ø	SN		2	
6	134	83	118	96	83	137	93	83Ø	SC		3	
7	1Ø4	66	1Ø7	77	66	121	7Ø	66Ø	SN		2	
8	283	76	116	87	76	134	83	76Ø	SN		2	

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	13Ø	5	338	8Ø	487	39	H	1448	1181	1115
2	123	Ø	194	3	4Ø9	17		933	1372	1351
3	123	Ø	19Ø	1	383	1Ø	T	954	1359	1289
4	122	-1	185	-1	368	5		1ØØ8	1326	1322
5	127	3	199	6	453	3Ø		1Ø61	1294	1238
6	122	-1	183	-2	372	6		1177	1229	1138
7	133	8	21Ø	12	51Ø	46		1Ø98	1273	1381
8	127	3	194	3	451	29	T	1151	1243	1281

NOTES: Runs included in base acceleration time averages: 2,3,4,5,6,8
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: Ø2 CRC Fuel Data Comments: Run 1

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	1ØØ1	4	1Ø	17	73		1644	1Ø2Ø	999.	142	240	473	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
								Avg:		142	240	473	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	158	73	75		74	76		735	SN		2	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	148	4	258	8	515	9	T	1640	1Ø21	997.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	167	75			76			755	SN			
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	148	4	253	5	472	Ø		1622	1Ø28	1518
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: Ø3 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	-Accel times- -5Ø	-6Ø	-7Ø	Surg
1	922	12	16	14	81		1475	1Ø86	1ØØ9	1Ø2	144	189	
2	923	12	16	17	82		1644	1Ø2Ø	936.	1ØØ	147	185	
3	927	17	12	17	68		1644	1Ø2Ø	1Ø34	95	137	189	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	99	143.	188.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	5ØØ	81	115	1Ø1	83	159	88	82Ø	SNP		1	
2	39	82	124	1Ø4	83	163	9Ø	825	SN		2	
3	2	68	1Ø2	76	68	112	68	68Ø	SC		1	
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	111	12	148	4	196	4		1372	1132	1Ø48
2	1Ø8	9	153	7	21Ø	12		1547	1Ø56	969.
3	11Ø	11	153	7	212	13		1535	1Ø61	1Ø75
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	461	83	121	99	85	142	99	84Ø	SNP			
2	91	85	131	1Ø3	86	161	1Ø1	855	SN			
3	4Ø5	68	1Ø1	73	68	123	72	68Ø	SC			
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	1Ø6	7	148	4	196	4		1372	1132	1Ø34
2	11Ø	11	151	6	21Ø	12	T	1491	1Ø79	971.
3	116	17	148	4	2Ø8	11		1527	1Ø64	1Ø78
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø; 1Ø
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: 04 CRC Fuel Data Comments: Runs 1,5

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -50	-60	-70	Surg
1	93Ø	1	15	14	74		1475	1Ø86	1Ø58	146	256	461	
2	93Ø	1	15	17	78		1644	1Ø2Ø	964.	13Ø	2Ø4	3Ø2	
3	93Ø	1	15	15	8Ø		1532	1Ø62	992.	134	21Ø	335	
4	1ØØ1	1	15	17	68		1644	1Ø2Ø	1Ø34	125	197	311	
5	1ØØ1	1	15	17	77		1644	1Ø2Ø	971.	146	223	346	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	13Ø.	2Ø4.	316	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	1Ø3	74	1Ø9	99	75	135	12Ø	745	SN		3	
2	123	78	123	1Ø6	78	14Ø	125	78Ø	SN		3	
3	16Ø	8Ø	115	1Ø6	8Ø	137	122	8ØØ	SN		6	1
4	176	68	1Ø3	89	69	132	11Ø	685	SN		5	1
5	174	77	11Ø	1Ø1	78	146	116	775	SN		5	
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	157	21	273	34	464	47		1530	1Ø63	1Ø32
2	156	2Ø	279	37	491	55		1654	1Ø16	96Ø.
3	149	15	243	19	372	18		1577	1Ø45	975.
4	144	11	243	19	376	19		1681	1ØØ7	1Ø17
5	146	13	278	36	432	37	T	1679	1ØØ8	955.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	142	75	116	1ØØ	75	128	112	75Ø	SN			
2	175	78	113	1Ø6	79	137	12Ø	785	SN			
3	152	8Ø	114	1Ø6	8Ø	136	12Ø	8ØØ	SN			
4	199	7Ø	1Ø5	98	72	13Ø	113	71Ø	SN			
5	172	79	112	1Ø7	79	143	126	79Ø	SN			
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	146	13	246	21	445	41		1501	1Ø75	1Ø4Ø
2	144	11	243	19	44Ø	39		1584	1Ø42	983.
3	141	9	23Ø	13	354	12		1524	1Ø66	996.
4	132	2	222	9	359	14		1657	1Ø15	1ØØ8
5	148	14	256	26	428	35		1618	1Ø29	966.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: 2,3,4
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: 05 CRC Fuel Data Comments: Runs 1,3

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	93Ø	1	15	14	7Ø		1475	1Ø86	1Ø86	119	184	272	T
2	93Ø	1	15	17	72		1644	1Ø2Ø	1ØØ6	157	224	313	H
3	93Ø	1	15	15	77		1532	1Ø62	1Ø13	161	227	312	H
4	1ØØ1	1	15	16	73		1588	1Ø41	1Ø2Ø	127	186	259	H
5	1ØØ1	1	2	14	8Ø		1475	1Ø86	1Ø16	113	178	26Ø	T
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	116	181	266	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	114	7Ø	131	78	71	159	74	7Ø5	SN		2	
2	117	72	134	83	73	17Ø	77	725	SN		6	1
3	449	77	142	89	78	176		775	SN		5	1
4	178	73	127		74	174		735	SN		2	
5	165	8Ø	131	92	81	187	88	8Ø5	SN		3	
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	128	1Ø	191	6	276	4	M	1497	1Ø77	1Ø73
2	137	18	2Ø2	12	279	5	H	1718	994.	977
3	123	6	186	3	264	-1	T	1596	1Ø38	985.
4	164	41	223	23	298	12	H	1652	1Ø17	993.
5	2Ø0	72	26Ø	44	331	24	H	1545	1Ø57	984.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	131	71	132		71	153		71Ø	SN			
2	118	73	132	86	74	17Ø	86	735	SN			
3	197	78	142		78	179		78Ø	SN			
4	161	76	13Ø		76	173		76Ø	SN			
5	162	81	14Ø	93	82	181	91	815	SN		5	2
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	115	-1	184	2	271	2	T	1479	1Ø84	1Ø77
2	139	2Ø			287	8	H	1678	1ØØ8	983.
3	224	93	288	59	376	41	H	152Ø	1Ø67	1Ø11
4	218	88	28Ø	55	354	33	H	1627	1Ø26	984.
5	195	68	258	43	331	24	H	1498	1Ø76	996.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: 1,5
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: 6 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	922	1	5	14	79		1475	1086	1023	101	159	229	T
2	923	1	5	12	82		1359	1138	1054	111	166	236	H
3	927	1	15	14	68		1475	1086	1100	104	160	236	T
4	927	17	12	17	78		1644	1020	964.	140	202	281	H
5	928	1	5	17	70		1644	1020	1020	102	154	220	
6	928	1	5	15	76		1532	1062	1020	99	154	217	T
							0	0	0				
							0	0	0				
									Avg:	102.	157.	226.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	451	80	96	127	82	173	89	810	SN		3	
2	40	83	131	98	84	176	89	835	SN		2	
3	421	68	117	76	68	139	72	680	SC		2	
4	446	78	133	86	78	159	82	780	SC		2	
5	55	70	117	81	71	130	78	705	SN		3	
6	422	76	122	90	78	169	87	770	SN		4	1
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	135	33	191	22	258	14	H	1392	1122	1045
2	146	44	203	30	274	22	H	1380	1128	1033
3	108	6	166	6	231	2	M	1478	1085	1099
4	120	18	180	15	241	7	H	1645	1020	964.
5	150	48	202	29	266	18	H	1610	1032	1029
6	119	17	177	13	235	4	H	1581	1043	994.
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	476	83	139	99	85	161	94	840	SN			
2	34	85	138	101	87	165	93	860	SN			
3	426	68	119	76	68	157	73	680	SC			
4	450	79	133	88	80	157	87	795	SC			
5	418	71	120	86	72	151	83	715	SN			
6	61	78	135	93	79	160	91	785	SN			
								0				

IDLE SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	113	11	176	12	254	13	H	1355	1140	1042
2	107	5	175	12	254	13	H	1336	1149	1037
3	102	0	162	3	230	2	T	1472	1087	1101
4	114	12	173	10	249	10	H	1605	1034	968.
5	100	-1	157	0	214	-5	M	1585	1042	1031
6	110	8	174	11	239	6	H	1533	1062	1003
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: 1,3,5,6
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 07 CRC Fuel Data Comments: Run 5

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	928	17	12	17	70		1644	1020	1020	119	179	252	
2	928	17	12	15	78		1532	1062	1006	126	194	267	M
3	929	17	12	14	69		1475	1086	1093	112	175	256	
4	929	17	12	15	79		1532	1062	999.	118	179	268	T
5	930	17	16	17	65		1644	1020	1055	130	183	278	
6	1012	17	7	12	75		1359	1138	1103	110	172	248	
							0	0	0				
							0	0	0				
									Avg:	115.	176.	256	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	415	71	99	77	71	140	78	710	SN		2	
2	437	80	107	87	80	156	95	800	SN		2	
3	130	70	98	76	71	135	75	705	SN		1	
4	110	80	108	84	80	150	86	800	SN		2	
5	122	65	97	70	65	130	68	650	SN		5	
6	254	76			76			760	SN		1	
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	176	53	246	40	330	29	H	1642	1021	1014
2			209	19	308	20	H	1583	1042	972.
3	122	6	194	10	269	5	T	1513	1070	1067
4	135	18	197	12	279	9	M	1573	1046	976.
5	165	44	230	30	340	33	M	1676	1009	1044
6	142	24	206	17	294	15	M	1381	1127	1085
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	416	71	104	84	71	145	85	710	SN			
2	427	80	118	96	80	158	96	800	SN			
3	119	72	101	81	72	128	81	720	SN			
4	149	81	112	89	82	146	93	815	SC			
5	109	66	99	74	66	119	73	660	SN			
6	269	77			77			770	SN			
								0				

IDLE SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	168	46	243	38	332	30	H	1613	1031	1024
2	180	57	253	44	332	30	H	1482	1083	1013
3	111	-3	178	1	251	-2	M	1453	1095	1081
4	162	41	233	32	320	25	H	1521	1067	986.
5	115	0	185	5	279	9	T	1663	1013	1041
6			202	15	274	7		1374	1131	1082
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: 1,3,4,6
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 08 CRC Fuel Data Comments: No
Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	928	4	10	17	79		1644	1020	957.	88	128	196	
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
									Avg:	88	128	196	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	428	79			80			795	SN		2	
								0				
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	89	1	131	2	197	1		1622	1028	962.
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	441	80			80			800	SN			
								0				
								0				
								0				
								0				
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	82	-7	122	-5	185	-6		1546	1057	987
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 9 CRC Fuel Data Comments: Runs 3,6

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø	Accelerations- "-5Ø x1Ø	"-6Ø x1Ø	"-7Ø x1Ø	Surg
1	927	17	12	12	71		1359	1138	1131	163	263	47Ø	
2	927	17	12	9	77		1183	1226	1177	138	213	382	
3	928	17	12	8	67		1124	1258	1279	14Ø	221	399	
4	928	17	12	6	74		1ØØ4	1328	13ØØ	122	2Ø3	358	
5	928	17	12	4	82		882	1405	1321	129	2Ø7	346	
6	929	17	12	4	74		882	1405	1377	113	19Ø	363	
7	929	17	12	2	83		759	1488	1397	126	2Ø2	339	
							Ø	Ø	Ø				
									Avg:	131	209.	365.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	429	71	1ØØ	92	72	136	114	715	SC			1
2	443	77	11Ø	1Ø2	78	141	126	775	SC			1
3	423	68	89	84	69	133	112	685	SN			1
4	4Ø9	74	97	91	75	141	121	745	SN			1
5	442	82	99	98	82	144	127	82Ø	SN			1
6	121	75	93	89	77	141	118	76Ø	SN			1
7	1Ø6	83	1Ø5	98	83	145	126	83Ø	SC			1

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- sec	%Inc	--15-6Ø-- sec	%Inc	--15-7Ø-- sec	%Inc	Surg ----	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø
1	336	156	43Ø	1Ø6	65Ø	78	H	1398	1123	1113
2	15Ø	15	41Ø	96	628	72	H	1254	1189	1136
3	2ØØ	53	28Ø	34	442	21	H	1222	1205	1216
4	193	47	275	31	44Ø	21	H	1101	1271	124Ø
5	158	21	231	1Ø	4ØØ	1Ø	M	964	1353	1269
6	152	16	237	13	44Ø	21	T	95Ø	1361	1319
7	14Ø	7	22Ø	5	363	Ø		843	1431	134Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	431	72	1Ø2	96	73	124	111	725	SC			
2	448	78	112	1Ø4	78	133	122	78Ø	SC			
3	41Ø	7Ø	91	84	7Ø	121	114	7ØØ	SN			
4	424	76	1ØØ	93	77	125	119	765	SN			
5	44Ø	81	1Ø3	1Ø1	81	139	133	81Ø	SN			
6	129	77	95	92	79	116	112	78Ø	SN			
7	1Ø1	83	1Ø8	99	84	129	123	835	SC			

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- sec	%Inc	--15-6Ø-- sec	%Inc	--15-7Ø-- sec	%Inc	Surg ----	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø
1	183	4Ø	372	78	558	53	H	1388	1124	1107
2	15Ø	15	34Ø	63	49Ø	34	H	1236	1198	1142
3	145	11	226	8			T	1206	1214	1214
4	141	8	213	2	37Ø	1		1Ø83	1282	1236
5	159	21	24Ø	15	395	8	H	959	1356	1279
6	136	4	215	3	39Ø	7		944	1365	13Ø9
7	142	8	223	7	365	Ø		837	1435	134Ø

NOTES: Runs included in base acceleration time averages: 2,3,4,5,7
RVP is psi x1ØØ; T@2ØV/L & Avg Air Temp are deg F x1Ø;
Acceleration times are sec. x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: 10 CRC Fuel Data Comments: No Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations- "-50	"-60	"-70	Surg
							x100	x10	x10				
1	927	4	10	14	75		1475	1086	1051	115	161	259	
2	927	4	10	11	78		1301	1165	1109	106	157	247	
3	928	4	10	11	70		1301	1165	1165	100	143	222	
4	928	4	10	10	75		1242	1195	1160	104	147	216	
5	928	4	10	7	81		1064	1293	1216	99	141	218	
6	929	4	10	3	69		821	1445	1452	101	148	226	
7	929	4	10	5	80		943	1366	1296	100	149	230	
8	1012	2	8	12	71		1359	1138	1131	89	133	202	T
9	1012	2	8	3	80		821	1445	1375	92	136	197	T
									Avg:	97.9	142.	216.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	435	75	118	103	75	123	107	750	SC		2	
2	432	78	125	110	78	133	113	780	SC		2	
3	62	70	118	101	70	130	104	700	SN		4	
4	63	75	119	105	76	140	115	755	SN		2	
5	433	81	131	116	82	142	122	815	SN		2	
6	148	69	112	94	70	127	104	695	SN		2	
7	113	80	121	103	82	137	106	810	SC		2	
8	296	72	99	96	72	112	95	720	SN		2	
9	280	80	111	107	80	135	111	800	SN		2	

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- sec	%Inc	--15-60-- sec	%Inc	--15-70-- sec	%Inc	Surg	RVP x100	T20 x10	T20A x10
1	262	168	318	123	425	97	H	1511	1071	1036
2	133	36	205	44	308	43	M	1386	1125	1069
3	145	48	182	28	264	22	M	1353	1140	1140
4	115	19	168	18	269	25		1327	1153	1114
5	168	72	213	50	311	44	H	1152	1243	1162
6	110	12	159	12	248	15		965	1352	1356
7	119	22	174	22	260	20		1030	1313	1236
8	95	-3	136	-5	207	-4	T	1389	1124	1110
9	102	4	150	5	227	5	T	924	1378	1308

NOTES: Runs included in base acceleration time averages: 3-9
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are secx10

1982 CRC Regular Vapor Lock, Cool

Car#: 11 CRC Fuel Data Comments: Runs 1,2

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	930	12	16	14	70		1475	1086	1086	153	260	399	
2	930	12	21	12	74		1359	1138	1110	172	278	445	
3	930	17	21	9	78		1183	1226	1170	157	251	375	
4	930	17	21	6	79		1004	1328	1265	141	220	320	T
5	1001	21	11	3	69		821	1445	1452	146	229	339	
6	1001	21	11	5	79		943	1366	1303	138	218	319	
							0	0	0				
							0	0	0				
									Avg:	142.	222.	326	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start Air	TcA	TcB	--Tmp @ End Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	144	70		101	71		106	705	SN			1
2	183	74	107	109	75	177	121	745	SN			1
3	145	78	124	118	78	187	131	780	SN			1
4	169	79	114	116	80	190	132	795	SN			1
5	192	70	112	104	72	180	123	710	SN			1
6	156	79	114	113	79	191	140	790	SN			2
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	170	20	338	52	625	92	T	1479	1084	1081
2	153	8	261	17	639	96	T	1414	1112	1081
3	198	40	338	52	558	71		1359	1138	1082
4	161	14	275	24	495	52	T	1160	1238	1172
5	156	10	270	21	396	21	T	910	1387	1380
6	153	8	280	26	490	50	T	1024	1316	1253
		0		0		0		0	0	

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start Air	TcA	TcB	--Tmp @ End Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	141	71		107	71		130	710	SN			
2	153	75	116	113	75	146	145	750	SN			
3	125	78	111	116	78	149	149	780	SN			
4	164	80	115	120	80	150	151	800	SN			
5	195	73	107	114	73	145	144	730	SN			
6	181	81	108	115	81	152	153	810	SN			
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	150	6	249	12	395	21		1459	1093	1086
2	161	14	260	17	410	26		1401	1118	1083
3	161	14	245	10	358	10		1335	1149	1093
4	149	5	235	6	329	1		1142	1248	1178
5	149	5	235	6	349	7	T	893	1398	1377
6	137	-3	211	-5	305	-6		1029	1313	1236
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: 4,5,6
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 12 CRC Fuel Data Comments: No
Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	927	17	12	17	74		1644	1020	992.	100	152	208	
2	1012	17	7	17	71		1644	1020	1013	88	136	186	
3	1012	17	2	14	79		1475	1086	1023	90	138	186	
4	1012	17	7	11	80		1301	1165	1095	94	136	188	
5	1013	17	7	10	68		1242	1195	1209	88	136	182	
6	1013	17	7	11	74		1301	1165	1137	86	132	180	
7	1013	17	7	12	80		1359	1138	1068	90	142	184	
							0	0	0				
									Avg:	89.3	137.	184.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	408	74	126	98	75	153	90	745	SC		1	
2	271	71	123	99	72	141	107	715	SN		1	
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	106	19	158	16	219	19		1608	1033	1002
2	98	10	142	4	210	14		1641	1021	1010
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	70	75	131	102	76	151	111	755	SC			
2	299	74	121	104	75	154	128	745	SN			
3	270	80	120	113	80	157	140	800	SN			
4	272	81	124	114	82	159	141	815	SN			
5	313	69	116	103	70	158	140	695	SN			
6	302	76	121	108	76	156	142	760	SN			
7	305	81	118	109	81	156	140	810	SN			

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	100	12	152	11	210	14		1566	1049	1010
2	98	10	144	5	286	55	H	1618	1029	998.
3	92	3	138	1	314	70	H	1528	1064	994.
4	100	12	148	8	246	33	M	1379	1128	1048
5	86	-4	136	0	188	2		1318	1157	1161
6	92	3	140	2	188	2		1375	1130	1088
7	88	-1	138	1	282	53	H	1413	1113	1036

NOTES: Runs included in base acceleration time averages: 2-7
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 13 CRC Fuel Data Comments: Run 1

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	927	4	10	17	60		1644	1020	1090	87	129	191	
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
							0	0	0				
						Avg:				87	129	191	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	404	68			68	76		680	SC			
								0				
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	87	0	133	3	193	1	T	1561	1051	1065
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	406	68			68			680	SC			
								0				
								0				
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	-15-50- Time	%Inc	-15-60- Time	%Inc	-15-70- Time	%Inc	Surg	RVP	T20	T20A
1	90	3	136	5	209	9	M	1579	1044	1534
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 14 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP x100	T20 x10	T20A x10	Accelerations- "-50	"-60	"-70	Surg
1	927	4	10	13	71		1417	1111	1104	90	138	240	
2	927	4	10	16	77		1588	1041	992.	102	158	264	H
3	927	4	10	14	79		1475	1086	1023	101	146	245	
4	928	4	10	14	68		1475	1086	1100	90	132	218	M
5	928	4	10	15	72		1532	1062	1048	88	129	219	T
							0	0	0				
							0	0	0				
							0	0	0				
									Avg:	92.3	136.	231.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	403	71	183	139	72	177	133	715	SC		3	
2	27	77	184	130	78	191	147	775	SC		3	
								0				
								0				
								0				
								0				
								0				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- sec	%Inc	--15-60-- sec	%Inc	--15-70-- sec	%Inc	Surg ----	RVP x100	T20 x10	T20A x10
1	88	-5	134	-2	220	-5		1489	1080	1070
2	130	41	218	60	323	40	H	1633	1024	971.
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0
		0		0		0			0	0

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	402	73	150	117	74	156	120	735	SC			
2	447	78	152	119	78			780	SC			
3	438	79	162	125	80	166	129	795	SC			
4	401	68	144	106	69	162	120	685	SN			
5	407	72	154	118	72	170	131	720	SN			
								0				
								0				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- sec	%Inc	--15-60-- sec	%Inc	--15-70-- sec	%Inc	Surg ----	RVP x100	T20 x10	T20A x10
1	94	2	139	2	247	7		1476	1085	1061
2	103	12	325	139	441	91	H	1594	1038	982.
3	105	14	308	126	409	77	H	1517	1068	1002
4	95	3	141	3	246	7	M	1535	1061	1072
5	94	2	140	3	306	33	H	1592	1039	1025
		0		0		0			0	0
		0		0		0			0	0

NOTES: Runs included in base acceleration time averages: 1,3,4,5
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 15 CRC Fuel Data Comments: Run 1

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations- 50	60	70	Surg
1	930	4	10	17	65		1644	1020	1055	88	139	191	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	88	139	191	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	136	65	119		65	136		650	SN			
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	79	-10	130	-6	185	-3		1672	1010	1045
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	127	66	125		66	139		660	SN			
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	83	-6	130	-6	183	-4		1652	1017	1045
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 16 CRC Fuel Data Comments: No

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	928	5	15	13	82		1417	1111	1027	116	173	258	
2	929	5	15	11	73		1301	1165	1144	113	173	261	
3	929	5	15	12	82		1359	1138	1054	112	166	259	
4	93Ø	5	15	12	65		1359	1138	1173	114	172	289	
5	93Ø	5	15	14	68		1475	1086	11ØØ	113	174	273	
6	93Ø	5	15	16	71		1588	1041	1034	122	179	274	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	115	173.	269	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp Air	@ Start TcA	TcB	--Tmp Air	@ End TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	417	82	113	121	81	136	137	815	SN		2	
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	125	9	37Ø	114	477	77	H	1443	11ØØ	1Ø19
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp Air	@ Start TcA	TcB	--Tmp Air	@ End TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	139	81	113	121	82	148	155	815	SN			
2	147	74	1Ø5	115	76	131	137	75Ø	SN			
3	132	82	113	122	83	138	144	825	SC			
4	133	65	98	1Ø2	65	119	126	65Ø	SN			
5	1Ø2	68	1Ø3	1Ø9	68	122	127	68Ø	SN			
6	116	71	1Ø8	112	72	128	13Ø	715	SN			
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- Time	%Inc	--15-6Ø-- Time	%Inc	--15-7Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	132	15	7Ø8	31Ø	796	196	H	1404	1117	1Ø36
2	122	6	186	8	295	1Ø		1381	1127	1Ø92
3	12Ø	4	188	9	386	43	M	1399	1119	1Ø32
4	117	2	186	8	285	6		1417	1111	1146
5	119	3	188	9	284	6		1558	1Ø52	1Ø66
6	114	-1	176	2	383	42	M	1645	1Ø2Ø	1ØØ9
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T@2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#: 17 CRC Fuel Data Comments: Run 1

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø	Accelerations- "-5Ø	"-6Ø	"-7Ø	Surg
1	929	4	1Ø	17	74		1644	1Ø2Ø	992.	12Ø	188	3Ø2	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
						Avg:		12Ø	188	3Ø2			

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp Air	@ Start-- TcA	TcB	--Tmp Air	@ End--- TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	135	74			76			75Ø	SN		4	1
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-5Ø-- sec	%Inc	--15-6Ø-- sec	%Inc	--15-7Ø-- sec	%Inc	Surg ----	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø
1	129	8	2Ø3	8	33Ø	9		1638	1Ø22	987.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp Air	@ Start-- TcA	TcB	--Tmp Air	@ End--- TcA	TcB	Avg AirT	Sky ---	Wind ----	Starting sec	RSt#
1	137	77	1Ø6		79	114		78Ø	SN			
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-5Ø-- sec	%Inc	--15-6Ø-- sec	%Inc	--15-7Ø-- sec	%Inc	Surg ----	RVP x1ØØ	T2Ø x1Ø	T2ØA x1Ø
1	121	Ø	187	-1	295	-1		1611	1Ø32	976.
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø:
Acceleration times are sec.x1Ø

1982 CRC Regular Vapor Lock, Cool

Car#:18 CRC Fuel Data Comments: Yes

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T20	T20A	Accelerations -50	-60	-70	Surg
1	930	4	10	17	78		1644	1020	964.	102	153	237	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	102	153	237	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	111	78			78			780	SN			
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	110	8	163	7	247	4		1438	1102	1046
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End--- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	163	78			78			780	SN		4	1
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	--15-50-- Time	%Inc	--15-60-- Time	%Inc	--15-70-- Time	%Inc	Surg	RVP	T20	T20A
1	107	5	161	5	249	5		1459	1093	1037
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix100; T@20V/L & Avg Air Temp are deg Fx10;
Acceleration times are sec.x10

1982 CRC Regular Vapor Lock, Cool

Car#: 19 CRC Fuel Data Comments: Runs 2,6

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations -5Ø	-6Ø	-7Ø	Surg
1	93Ø	12	16	17	7Ø		1644	1Ø2Ø	1Ø2Ø	126	227	385	
2	93Ø	12	21	15	71		1532	1Ø62	1Ø55	129	21Ø	398	
3	93Ø	17	21	17	76		1644	1Ø2Ø	978.	128	2Ø1	394	M
4	93Ø	17	21	16	78		1588	1Ø41	985.	148	212	345	H
5	1Ø01	21	11	17	74		1644	1Ø2Ø	992.	126	21Ø	348	
6	1Ø01	21	11	15	81		1532	1Ø62	985.	125	198	439	H
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	126	219.	367.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	124	7Ø	1Ø2	1Ø4	71	131	97	7Ø5	SN		5	
2	126	72	95	1Ø1	72	132	11Ø	72Ø	SN		1	
3	14Ø	76	1Ø9	115	76	141	113	76Ø	SN		1	
4	1Ø8	78	111	12Ø	78	159	115	78Ø	SN		1	
5	157	75	1Ø1	1Ø9	77	16Ø	115	76Ø	SN		4	
6	191	81	1Ø3	114	81	165	117	81Ø	SN		2	
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	142	13	275	26	472	29		1669	1Ø11	1ØØ8
2	131	4	241	1Ø	411	12		1585	1Ø42	1Ø28
3	13Ø	3	244	12	51Ø	39	T	1711	997.	955.
4	159	26	258	18	465	27	H	1653	1Ø17	961.
5	212	68	321	47	555	51	H	1692	1ØØ3	961.
6	171	36	267	22	439	2Ø	H	1609	1Ø33	956.
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	146	71	93	113	71	124	127	71Ø	SN			
2	15Ø	73	96	113	73	139	142	73Ø	SN			
3	436	76	1Ø1	118	77	149	153	765	SN			
4	171	79	1Ø5	12Ø	79	149	151	79Ø	SN			
5	188	78	1Ø1	12Ø	79	154	157	785	SN			
6	196	81	1Ø5	124	81	157	16Ø	81Ø	SN			
								Ø				

IDLE SOAK ACCELERATIONS

Run#	-15-5Ø- Time	%Inc	-15-6Ø- Time	%Inc	-15-7Ø- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	142	13	233	7	43Ø	17		1663	1Ø13	1Ø06
2	158	25	24Ø	1Ø	461	26		1566	1Ø49	1Ø28
3	2Ø6	63	3ØØ	37	485	32	H	167Ø	1Ø11	965.
4	189	5Ø	26Ø	19	415	13	H	1609	1Ø33	97Ø.
5	262	1Ø8	37Ø	69	551	5Ø	H	1659	1Ø15	955.
6	262	1Ø8	351	61	476	3Ø	H	1565	1Ø49	972.
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: 1,5
RVP is psi×1ØØ; T@2ØV/L & Avg Air Temp are deg F×1Ø;
Acceleration times are sec.×1Ø

1982 CRC Alternate Vapor Lock, Hot

Car#: 05 CRC Fuel Data Comments: Run 3

Temp Adjustment =.70F/1.0F

BASE DATA

Run#	Date	Drvr	Obsr	[illegible]1	AirT	Wind	RVP	T20	T20A	Accelerations- 0-30	0-50	0-60	Surg
1	1015	1	11	6	92		1004	1328	1349	76	155	223	T
2	1015	1	11	8	94		1124	1258	1265	84	163	228	T
3	1015	1	11	4	91		882	1405	1433	79	157	224	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	79.7	158.	225	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	--Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	388	92			93			925	SC		5	2
2	387	94			94			940	SC		2	
3	389	91			90			905	SC		2	
								Ø				
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	---Ø-3Ø-- Time	%Inc	---Ø-5Ø-- Time	%Inc	---Ø-6Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	77	-3	212	34	278	24	H	1050	1301	1318
2	76	-5	212	34	273	21	H	1211	1211	1218
3	77	-3	175	11	237	5	H	975	1346	1377
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Imp² @ Start- Air	TcA	TcB	--Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	391	95			95			950	SC		2	1
2	378	93			93			930	SC			
3	369	91			91			910	SC		2	1
								Ø				
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	---Ø-3Ø-- Time	%Inc	---Ø-5Ø-- Time	%Inc	---Ø-6Ø-- Time	%Inc	Surg	RVP	T2Ø	T2ØA
1	71	-11	169	7	235	4	H	1039	1307	1307
2	82	3	255	61	325	44	H	1177	1229	1243
3	76	-5	151	-5	221	-2	T	974	1347	1375
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All
RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø;
Acceleration times are sec x1Ø

1982 CRC Alternate Vapor Lock, Hot

Car#: 14 CRC Fuel Data Comments: No

Temp Adjustment =.7ØF/1.ØF

BASE DATA

Run#	Date	Drvr	Obsr	Fuel	AirT	Wind	RVP	T2Ø	T2ØA	Accelerations- Ø-3Ø	Ø-5Ø	Ø-6Ø	Surg
1	1Ø14	1	2	9	91		1183	1226	1254	55	117	162	
2	1Ø16	11	7	11	9Ø		13Ø1	1165	12ØØ	58	124	164	
3	1Ø16	7	11	13	92		1417	1111	1132	53	114	155	
4	1Ø16	11	7	15	93		1532	1Ø62	1Ø76	54	124	162	
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
							Ø	Ø	Ø				
									Avg:	55	12Ø.	161.	

KEY-OFF SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	376	91	123	11Ø	91	2Ø5	154	91Ø	SN		4	
2	368	9Ø			91			9Ø5	SN		2	
3	55Ø	92			92			92Ø	SN		3	
4	549	93			92			925	SN		3	
								Ø				
								Ø				
								Ø				

KEY-OFF SOAK ACCELERATIONS

Run#	Ø-3Ø Time	Ø-3Ø %Inc	Ø-5Ø Time	Ø-5Ø %Inc	Ø-6Ø Time	Ø-6Ø %Inc	Surg	RVP	T2Ø	T2ØA
1	57	4	132	1Ø	2Ø4	27	H	123Ø	12Ø1	1229
2	6Ø	9	118	-1	16Ø	Ø		131Ø	1161	1193
3	55	Ø	115	-4	184	14	H	1429	1106	1127
4	6Ø	9	122	2	218	36	H	15ØØ	1Ø75	1Ø93
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

IDLE SOAK CONDITIONS

Run#	Smp#	-Tmp @ Start- Air	TcA	TcB	-Tmp @ End- Air	TcA	TcB	Avg AirT	Sky	Wind	Starting sec	RSt#
1	383	9Ø	135	11Ø	9Ø		144	9ØØ	SN			
2	382	91			91			91Ø	SN			
3	514	93			93			93Ø	SN			
4	547	92			92			92Ø	SN			
								Ø				
								Ø				
								Ø				

IDLE SOAK ACCELERATIONS

Run#	Ø-3Ø Time	Ø-3Ø %Inc	Ø-5Ø Time	Ø-5Ø %Inc	Ø-6Ø Time	Ø-6Ø %Inc	Surg	RVP	T2Ø	T2ØA
1	56	2	119	-1	163	1		1198	1218	1253
2	6Ø	9	122	2	172	7	M	1279	1181	1209
3	59	7	124	4	239	49	H	1384	1126	1140
4	62	13	13Ø	9	368	129	H	1415	1112	1133
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø
		Ø		Ø		Ø			Ø	Ø

NOTES: Runs included in base acceleration time averages: All RVP is psix1ØØ; T2ØV/L & Avg Air Temp are deg Fx1Ø; Acceleration times are sec.x1Ø

1982 CRC HOT DRIVEABILITY SUMMARY
(Cooperative Laboratory Data)

Car# Ø1, Drvr# 1Ø

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	24	8		252	7Ø2	46Ø			775	2Ø	1384	936	1121	44.1
2	1Ø			78	174	4			232	9	1255	9ØØ	1188	28.2
3	12			66	366	32			394	9	1237	9Ø6	1198	27.9
4	1			114	738	1ØØ			757	1	783	82Ø	1471	2Ø.2

Car# Ø2, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	39			6	54				99	2Ø	14Ø4	926	1111	44.9
2	114				12				126	17	1633	876	1Ø24	34.2

Car# Ø3, Drvr# 1Ø

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	74			48	42				164	2Ø	1209	994	1215	37.2
2	74			12	6				86	17	1193	1Ø42	1221	27.1

Car# Ø4, Drvr# 17

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	39			822	828	324			891	2Ø	1361	9Ø4	1133	43.2
2	38			33Ø	828	156			866	11	1248	928	1192	28.1
3	36			6					42	1	988	9Ø6	1338	23.7
4	72	8		852	864	524			942	17	1301	938	1165	28.9

Car# Ø5, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	66			732	33Ø	32			85Ø	2Ø	1378	898	1124	43.9
2	68			54	1Ø8				23Ø	5	1ØØ7	9Ø4	1326	24.Ø

Car# Ø6, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	3				6				9	2Ø	1348	96Ø	1139	42.7
2	2Ø				9Ø				11Ø	17	1298	1ØØØ	1167	28.9
3	18				66				84	14	1234	1Ø5Ø	1199	27.8
4	21				84				1Ø5	1	917	1Ø66	1382	22.5

Car# Ø7, Drvr# 1Ø

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	2	16		6					22	2Ø	1282	1Ø54	1174	4Ø.1
2	2	32		6					4Ø	17	1319	1Ø66	1157	29.2
3		8							8	14	1336	93Ø	1149	29.5

Car# Ø8, Drvr# 1Ø

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1									Ø	2Ø	1282	982	1174	4Ø.1
2			1						1	17	1341	96Ø	1146	29.6

NOTE:RVP is psi x 1ØØ; Avg air temperature & T2ØV/L are deg F x 1Ø

1982 CRC HOT DRIVEABILITY SUMMARY
(Cooperative Laboratory Data)

Run#	Idle Demerits- Ruff	Stll	ReSt	Driving Demerits--- Hes	Stmb	Surg	Bkfr	Stll	TWD	Fuel #	RVP Avg	AirT Avg	T2Ø Avg	%158 Avg
Car# Ø9, Drvr# Ø4														
1	56	16	2	6	234	32		96	376	2Ø	1259	982	1187	39.2
2	64			54	186	4			254	13	1302	926	1165	28.9
3	61			48	2Ø4	4			269	9	1209	93Ø	1212	27.4
4	52				132				184	9	1225	9Ø6	1204	27.7
5	72				174				246	1	792	82Ø	1465	2Ø.3
Car# Ø9, Drvr# 1Ø														
6	81								81	2Ø	1435	772	1Ø96	46.2
Car# 1Ø, Drvr# 1Ø														
1	58			48	792	8			874	2Ø	1357	912	1135	43.1
2	61				666				727	9	12ØØ	9ØØ	1217	27.3
3	34			6	72	4			116	1	768	81Ø	1482	19.9
4	34			96	7Ø8	4			766	2Ø	1421	824	1103	45.6
Car# 1Ø, Drvr# Ø4														
5	77			84Ø	816	248			917	2Ø	1426	86Ø	11ØØ	45.8
Car# 1Ø, Drvr# 17														
6	26			24	492	72			53Ø	2Ø	1399	858	1114	44.7
Car# 11, Drvr# Ø4														
1	36				24				6Ø	2Ø	1456	9Ø2	1Ø86	47.Ø
2	48								48	5	98Ø	936	1343	23.6
Car# 12, Drvr# 1Ø														
1	31			714	7Ø2	332			793	2Ø	1148	998	125Ø	34.8
2	2			54Ø	396	8			66Ø	5	952	1Ø32	136Ø	23.1
3	19			138	18		6		175	1	749	1Ø64	1495	19.6
4	22			492	186	12			578	9	1176	924	123Ø	26.9
5	77			42	684	28	6		761	2Ø	1375	858	1126	43.8
Car# 12, Drvr# Ø4														
6	1Ø4			756	594	268			884	2Ø	1445	83Ø	1Ø91	46.5
Car# 12, Drvr# 17														
7	52			732	498	296			812	2Ø	14ØØ	884	1113	44.8
Car# 13, Drvr# Ø4														
1					6				6	17	1173	932	1231	26.8
2					24				24	2Ø	1134	984	1258	34.3

NOTE: Avg RVP is psi x 1ØØ; Avg air temperature & T2ØV/L are deg F x 1Ø

1982 CRC HOT DRIVEABILITY SUMMARY
(Cooperative Laboratory Data)

Car# 14, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	36			582	744	276			8Ø4	1Ø	1108	1026	1267	25.7
2	36			24Ø	294	92			36Ø	6	976	1062	1345	23.5
3	36			24	66	12			112	9	1216	9Ø2	1209	27.5
4	36				12				48	1	779	812	1474	2Ø.1
5	39			3Ø6	282	84			393	2Ø	1444	8Ø4	1Ø91	46.5
6	57			384	39Ø	64			567	2Ø	1394	888	1116	44.5

Car# 15, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	38	24	4	24	36	44		64	214	2Ø	1312	912	1159	41.2
2	37	24	4	6	6	2Ø		32	1Ø1	17	1299	9ØØ	1166	28.9

Car# 16, Drvr# 17

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	49			2Ø4	342	228			445	2Ø	1432	92Ø	1Ø98	46.Ø
2	34				6	4			44	5	996	918	1333	23.8

Car# 17, Drvr# 1Ø

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	94				3Ø				124	2Ø	1367	928	1132	43.5
2	144	24	27		12				179	17	1579	878	1Ø44	33.4
Car# 17, Drvr# 17														
3	91			48	54				151	2Ø	1401	936	1113	44.8

Car# 18, Drvr# Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	51				6	4			61	2Ø	1281	842	1175	4Ø.1
2	37				6				43	17	1573	864	1Ø46	33.3

Car# 19, Drvr# 17

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
----	Ruff	Stll	ReSt	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	36			3Ø		8			7Ø	2Ø	1409	898	1109	45.1
2	36			18		8			62	5	1Ø41	926	1306	24.6

NOTE: Avg RVP is psi x 1ØØ; Avg air temperature & T2ØV/L are deg F x 1Ø

1982 CRC (1975) HOT START & DRIVEAWAY SUMMARY
(Cooperative Laboratory Data)

Car# 01, Drvr: 10

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		23		6	234	4			263	1	788	893	1468	20.3

Car# 02, Drvr: 04

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		82			48				130	20	1407	888	1110	38.7
2		86			12			32	124	17	1514	923	1070	32.4

Car# 03, Drvr: 10

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		21		18		8			47	20	1359	930	1134	29.9
2		49		42	6	12			97	17	1420	910	1110	30.9

Car# 05, Drvr: 04

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	2	86		12	132	60		90	324	20	1426	923	1100	39.3
2		80			42	8		32	156	5	972	938	1348	23.4

Car# 07, Drvr: 10

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		33			78	28		64	187	20	1388	938	1119	38.0
2		33		18	156	48			219	14	1429	890	1106	31.0

Car# 07, Drvr: 04

3		46		6	12	20		64	136	1	874	938	1410	21.8

Car# 09, Drvr: 04

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	2	68		6	36	16		224	326	20	1394	900	1118	38.2
2	1	76			12	8		160	248	9	1229	928	1202	27.7

Car# 10, Drvr: 10

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		23		108	180	8			239	20	1437	895	1095	39.7

Car# 12, Drvr: 10

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T20	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1		19		96	150	36		64	259	20	1461	870	1083	40.5
2		57		18	36	8			115	5	1036	880	1309	24.5

NOTE: Avg RVP is psi x 100; Avg air temperature & T@20V/L are deg F x 10

1982 CRC (1975) HOT START & DRIVEAWAY SUMMARY
(Cooperative Laboratory Data)

Car# 14, Drvr: Ø4

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	7	56		1Ø8	84	32		192	374	2Ø	1376	933	1125	37.6
2		31			24				55	6	1Ø72	9Ø8	1288	25.1

Car# 16, Drvr: 17

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	2	4Ø		96	72	48			186	2Ø	1437	923	1Ø95	39.7

Car# 18, Drvr: Ø7

Run#	Idle Demerits-			----Driving Demerits---					TWD	Fuel	RVP	AirT	T2Ø	%158
	StTm	Ruff	Stll	Hes	Stmb	Surg	Bkfr	Stll	---	#	Avg	Avg	Avg	Avg
1	9	17	16						33	2Ø	129Ø	888	117Ø	34.6
Car# 18, Drvr: 17														
2	5	15	16	6	6	4		64	1Ø7	17	1519	925	1Ø68	32.4

NOTE: Avg RVP is psi x 1ØØ; Avg air temperature & T2ØV/L are deg F x 1Ø

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